Smithsonian Institution

Annual Standards and Specifications for Stormwater Management and Erosion & Sediment Control

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Prepared for:
Virginia Department of Environmental Quality
Office of Stormwater Management
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I certify under penalty of law that all documents and all attachments related to the submission and updating of the Smithsonian Institution's Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management have been prepared under my supervision and in a system designed to assure that qualified personnel gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of a fine and imprisonment for knowing violations.

01.21.2020

Date

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ACRONYMS / ABBREVIATIONS

AS&S	Annual Standards & Specifications
BMP	Best Management Practice
DCR	Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
ESC	Erosion & Sediment Control
ESD	Environmental Site Design
CGP	Construction General Permit
SI	Smithsonian Institution
LDA	Land Disturbing Activity
LID	Low Impact Development
NRCS	Natural Resources Conservation Service
MCM	Minimum Control Measures
MS4	Municipal Separate Storm Sewer Systems
PAE	Pacific Architects & Engineers
P2	Pollution Prevention
PR	Pollutant Removal
PY	Permit Year
RLD	Responsible Land Disturber
RR	Runoff Reduction
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
USDOE	United States Department of Energy
VAC	Virginia Administrative Code
VESCH	Virginia Erosion & Sediment Control Handbook
VESCLR	Virginia Erosion & Sediment Control Laws & Regulations
VPDES	Virginia Pollution Discharge Elimination System
VRRM	Virginia Runoff Reduction Method
VSMA	Virginia Stormwater Management Act
VSMP	Virginia Stormwater Management Program

EXECUTIVE SUMMARY

Smithsonian Institution (SI) is the world's largest museum and research facility. SI is dedicated to animal care, science, education and sustainability. They strive towards "the increase and diffusion of knowledge" by:

> "Shaping the future by preserving our heritage, discovering new knowledge, and sharing our resources with the world"

Smithsonian is currently authorized to discharge under the Virginia Stormwater Management Program (VSMP) and the Virginia Stormwater Management Act (VSMA).

These annual standards and specifications have been prepared in the effort to effectively manage a compliant stormwater management program for all applicable projects that will be executed onsite in the future.

1.0 Annual Standards and Specifications – Administration

1.1. All land-disturbing activities regulated by the Virginia Stormwater Management Act (VSMA), the Virginia Stormwater Management Program (VSMP) Permit Regulations, the Virginia Erosion and Sediment Control (ESC) Law, the Virginia ESC Regulations and the Virginia Pollution Discharge Elimination System (VPDES) Program Permit Regulations shall adhere to the approved Smithsonian Institution (SI) Annual Standards and Specifications for Stormwater Management (SWM) and Erosion and Sediment Control (ESC) as approved by the Virginia Department of Environmental Quality (DEQ). The use of Virginia Erosion and Sediment Control Handbook (VESCH), along with accompanying technical documents and guidance, control measures are strongly preferred. Non-VESCH control measures, best management practices (BMP), and specifications may be included in the Annual Standards and Specifications submission but their use may be further reviewed and approved by DEQ on a project-specific basis. Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized. These Annual Standards and Specifications shall include or reference all VESCH specifications and related technical documents and guidance specifications.

1.2. The approved SI Annual Standards and Specifications for SWM and ESC are composed of general specifications for land- disturbing activities and include, by reference, the following applicable laws, regulations, and technical guidance, as amended:

- VSMA (§62.1-44. 15:24 et seq.);
- VSMP Regulations (9VAC25-870 et seq.);
- Virginia Stormwater Management Handbook, 1999, as amended;
- Virginia ESC Law (§62.1-44 et seq.);
- Virginia ESC Regulations (9VAC25-840 et seq.);
- Virginia ESC Certification Regulations (9VAC25-850 et seq.);
- Virginia Erosion & Sediment Control Handbook (VESCH), 1992.
- VPDES Program Permit Regulations (9VAC25-31)

1.3. Site-Specific Stormwater Pollution Prevention Plans (SWPPP) shall be prepared for all projects involving a regulated land-disturbing activity (equal to or greater than 1-acre) that requires a General VPDES Permit for Discharges of Stormwater from Construction Activities. All projects requiring a SWPPP must submit a site-specific SWPPP to the Smithsonian designated DEQ-Certified SWM Plan Reviewer for review and approval, along with obtaining VAR10 Permit Authorization from DEQ prior to initiating any onsite land disturbing activities associated with the project.

1.4. Site-Specific ESC Plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in the Virginia ESC Regulations (10,000-square feet or more). Site-specific ESC Plans shall be submitted to the Smithsonian designated DEQ-Certified ESC Plan Reviewer for review and approval prior to initiating any onsite land disturbing activities associated with the project.

1.5. Individual site-specific plans, to the maximum extent practicable, shall comply with any locality VESCP and VSMP authority's technical requirements adopted pursuant to the SWM Act and ESC Law and attendant Regulations. It shall be the responsibility of the standards and specifications holder to demonstrate that the locality's VESCP and VSMP authority's technical requirements are not practicable for the project under consideration

1.6. DEQ shall perform oversight:

- The Department and the Board, where applicable, shall provide project oversight and enforcement as necessary and comprehensive program compliance review and evaluation.
- The Board shall have the authority to enforce approved specifications and charge fees equal to the lower of (i) $1,000 or (ii) an amount sufficient to cover the costs associated with standard and specification review and approval, project inspections, and compliance.

2.0 Annual Standards and Specifications – Project Tracking, Notifications, and Reporting

2.1. All land-disturbing activities occurring on Smithsonian property shall meet the technical requirements of the approved SI Annual Standards and Specifications for SWM and ESC in addition to the regulatory and technical requirements noted in Section 1.2. The applicable DEQ Central Office requires e-notification two weeks prior to initiating a regulated land disturbance activity. Once the start date of a regulated land disturbance has been determined, the project manager must provide the following information to the Smithsonian designated DEQ-Certified Program Administrator for official submittal to DEQ.

The e-notification must include:

- Project name or project number (any associated CGP permit #);
- Project location (including nearest intersection, latitude and longitude, access point)
- On-site project manager name and contact info
- Responsible Land Disturber (RLD) name and contact info
- Project description
- Acreage of disturbance for project
- Project start and finish date
- Any variances/waivers/exemptions associated with this project.

A "land disturbing activity" (LDA) or "Land disturbance" is any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into State waters or onto lands in the Commonwealth, or that potentially changes its runoff characteristics; including clearing, grading, or excavation, except that the term shall not include those exemptions as specified in § 62.1- 44.15:34 as well as those listed below.

- Individual service connections;
- Installation, maintenance, or repair of any underground public or private utility lines when such activity occurs on an existing hard surface road, street, or sidewalk, provided that the land-disturbing activity is confined to the area of the road, street, or sidewalk that is hard surfaced;
- Disturbed areas of less than 10,000 square feet in size; however, Smithsonian may reduce this exception to a smaller area of disturbed land or qualify the conditions under which this exception shall apply;
- Installation of fence and sign posts or telephone and electric poles and other kinds of posts or poles;
- Emergency work to protect life, limb, or property, and emergency repairs; however, if the land-disturbing activity would have required an approved ESC Plan, if the activity were not an emergency, then the

land area disturbed shall be shaped and stabilized in accordance with the requirements of the approved SI Annual Standards and Specifications for SWM and ESC and all applicable regulations.

2.2. Under these Annual Standards and Specifications, SI shall keep records in accordance with the following:

- The approved erosion and sediment control plan and stormwater management plan shall be maintained onsite and made available.
- Project records, including approved erosion and sediment control and stormwater management plans, shall be kept for three years after state permit termination or project completion.
- SI shall maintain, either onsite or in AS&S files, a copy of the approved plan and a record of inspections for each active land disturbing activity. Record of inspections for each active land-disturbing activity must be maintained for at least three years from the date permit coverage expires or is terminated. The period of record retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to SI, or as requested by the Board or DEQ.
- Construction record drawings shall be maintained in perpetuity or until stormwater management facility is removed.
- Under Construction General Permit coverage, all registration statements submitted in accordance with 9VAC25-870-59 shall be documented and retained for at least three years from the date of project completion or state permit termination.

On a fiscal year basis (July 1 to June 30), Smithsonian designated DEQ-Certified Program Administrator shall report to the department by July 1st of each year in a format provided by the department. The information to be provided shall include the following:

- Information on each permanent stormwater management facility completed during the fiscal year to include type of stormwater management facility, geographic coordinates, acres treated, and the surface waters or karst features into which the stormwater management facility will discharge;
- Number and type of enforcement actions during the fiscal year; and
- Number of exceptions granted during the fiscal year.

These Standards and Specifications are required to be re-submitted annually. Reports and notifications should be sent to Standardsandspecs@deq.virginia.gov. Additionally, the operator shall make all site documents, including all amendments, modifications, updates, and the SWPPP available upon request by the department, the EPA, the public, or the operators of a municipal separate storm sewer system (MS4) receiving discharges from the construction activity. The information must be available electronically for public review.

2.3 **E-reporting** – SI may, at DEQ's discretion, be required to provide weekly e-reporting to the Department's applicable regional office. Weekly reports should include the following items:

- Inspection reports;
- Pictures;
- Complaint logs and complaint responses; and
- Other compliance documents

2.4 **Public Involvement –**Under the Construction General Permit (CGP), the operator shall post the notice of coverage letter at a publicly accessible location near an active part of the construction project (e.g., where a pipeline crosses a public road). The operator shall maintain the posted information until termination of general permit coverage.

2.5 **Documenting On-site Changes –** Any onsite revisions to the Erosion and Sediment Control plan must be reviewed, approved, documented, and on the plans. The site superintendent and the certified Smithsonian Institution Inspector must initial and date the changes made directly on the approved set of plans kept on site. Additionally, all revisions must be checked and signed off by a DEQ-certified inspector and if such modifications require a submittal of the ESC and/or SWM plan they shall be reviewed and reapproved by the DEQ-certified plan reviewer.

SWPPP amendments, modifications, and updates must comply with the regulations laid out in 9VAC25-880-70 Part II C. Amendments to the SWPPP must be documented by the operator when there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to surface waters. The SWPPP must be amended during inspections or investigations by the certified Smithsonian Institute Inspector, or by local, state, or federal officials. Amendments shall be made if it is determined that the existing controls are ineffective. The operator shall update the SWPPP no later than seven days following any modifications. All modifications or updates to the SWPPP shall be noted and shall include the following items:

a) A record of dates when:
   (1) Major grading activities occur;
   (2) Construction activities temporarily or permanently cease on a portion of the site; and
   (3) Stabilization measures are initiated;
b) Documentation of replaced or modified controls where periodic inspections or other information have indicated that the controls have been used inappropriately or incorrectly and where modified as soon as possible;
c) Areas that have reached final stabilization and where no further

SWPPP or inspection requirements apply;

d) All properties that are no longer under the legal control of the operator and the dates on which the operator no longer had legal control over each property;
e) The date of any prohibited discharges, the discharge volume released, and what actions were taken to minimize the impact of the release;
f) Measures taken to prevent the reoccurrence of any prohibited discharge; and
g) Measures taken to address any evidence identified as a result of an inspection required under Part II G.

2.6 Offsite Support Activities - Offsite support activities (such as concrete/asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) are required to be included in the SWPPP documents. Support activities are directly related to the construction activity, and are not a commercial operation nor serve multiple unrelated construction activities by different operators. Appropriate control measures for support activity sites must be identified in the SWPPP and implemented in order to control any discharges from these offsite areas. Support activity controls must be shown in the Erosion and Sediment Control and Stormwater Management Plans.

3.0 Annual Standards and Specifications – Personnel

Smithsonian's designated DEQ-Certified personnel shall provide plan review for all applicable LDAs at Smithsonian and provide administration of the SI Annual Standards and Specifications for SWM and ESC. The following is a summary of responsibilities and titles as related to the SI Annual Standards and Specifications for SWM and ESC.

3.1 **SWM and ESC Program Administrator** shall have overall management and coordination responsibilities for the SI Annual Standards and Specifications for SWM and ESC. This person(s) shall be certified by DEQ as a Combined Administrator. Note the program administrator must be maintained in-house and may not be contracted out to third parties.

3.2 **SWM Plan Reviewers** shall be responsible for reviewing plans for compliance with the SI Annual Standards and Specifications for SWM and ESC and applicable laws and regulations. The plan reviewer shall be certified by DEQ as a SWM Plan Reviewer.

3.3 **ESC Plan Reviewers** shall be responsible for reviewing plans for compliance with the SI Annual Standards and Specifications for SWM and ESC and applicable laws and regulations. The plan reviewer shall be certified by DEQ as an Erosion & Sediment Control Plan Reviewer.

3.4 **SWM and ESC Inspectors** shall have the responsibility for inspecting stormwater management activities, SWPPP projects, Municipal Separate Storm Sewer Systems (MS4) practices and ESC Plan projects to ensure compliance with the SI Annual Standards and Specifications for SWM and ESC, along with all applicable laws and regulations. The assigned persons shall be certified by DEQ as an Inspector for SWM and ESC. The Project Manager or site subcontractor shall also designate a competent person to conduct 'self-inspections' of SWPPP and ESC Plan projects. Inspection reports shall be kept onsite and available to Smithsonian personnel during inspections.

3.5 **Responsible Land Disturber (RLD),** as assigned by the Project Manager or site subcontractor, shall hold a valid RLD Certificate as issued by DEQ and shall be accountable for assigned projects.

3.6 **Certifications** shall be in accordance with the Virginia ESC and SWM Certificate Regulations. All certifications requirements are fulfilled by completing the DEQ training courses and passing the certification exam. Note that any licensed professionals are automatically certified as ESC plan reviewers. All other SWM and ESC certifications required a certificate of competency.

4.0 Annual Standards and Specifications – Implementation

Smithsonian's designated DEQ-Certified personnel shall be responsible for the implementation of and compliance with the SI Annual Standards and Specifications for SWM and ESC. Smithsonian's DEQ-Certified personnel shall conduct reviews and inspections of LDA's (including new construction, renovation and demolition projects) for compliance with the SI Annual Standards and Specifications for SWM and ESC, along with all applicable laws and regulations. Prior to commencement of a LDA, the project must have received a stamped set of plans by the Smithsonian's designated DEQ-Certified Plan Reviewer and an approval letter signed by the AS&S DEQ-certified Program Administrator. Additionally, coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities, as applicable, must be obtained.

4.1 Submittals

SWM and ESC Plans, reports, certifications, and other record documents shall be submitted to Smithsonian designated DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved SI Annual Standards and Specifications for SWM and ESC.

4.2 Plan Reviews

Plan reviews shall be conducted by staff certified in accordance with the VSMP Regulations and Virginia ESC Certification Regulations. Plan reviews shall ensure compliance with the approved SI Annual Standards and Specifications for SWM and ESC, Virginia Stormwater Management Act, Erosion and Sediment Control Law and attendant Regulations.

4.3 Inspections

Smithsonian's designated DEQ-Certified SWM and ESC Inspector(s) are responsible for enforcing the project specific SWPPP and/or ESC Plan and other environmental compliance requirements associated with the Pollution Prevention (P2) Plan portion. The site subcontractor shall also designate a competent person to conduct 'self-inspections' of SWPPP and ESC Plan projects. Inspection reports shall be kept onsite and available to the Smithsonian designated DEQ-Certified Inspector.

The RLD shall be in charge of and responsible for carrying out any regulated LDA's for applicable projects.

Smithsonian's designated DEQ-Certified SWM and ESC inspector is responsible for coordination with the project manager, the onsite superintendent, and the project appointed Inspector to initiate scheduled inspections, onsite surveys and documentation of the SWM facility and/or stormwater conveyance channels ensuring the structures are constructed in accordance with the approved Plan.

Inspections are to be conducted at a frequency of:

- At least once every five business days; or
- At least once every ten business days and no later than 48 hours following a measurable storm event (0.25 inches of rain or greater over a 24-hour period).
- During or immediately following initial installation of erosion and sediment controls

All inspections will be summarized in an inspection report to be provided to the project manager or construction site superintendent within 24 hours of each inspection. If the listed violations on the Compliance report are not completed by the required corrective action deadline date, a notice to comply, stop work order, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance.

Follow up inspections may be required/requested on a case-by-case basis.

4.4 Revisions, Updates, or Amendments to Approved SWM and ESC Plans

An approved SWM or ESC Plan may be revised, updated or amended by the Smithsonian Project Manager in the following cases:

- Inspection reveals that the approved Plan is not in compliance with applicable regulations; or
- Changes in project planning or circumstances have altered the effectiveness of the approved Plan in maintaining compliance.

Any revisions, updates, or amendments to the approved Plan must be submitted in writing to the Smithsonian SWM and ESC Program Administrator for review and approval. The amendments must comply with the approved SI Annual Standards and Specifications for SWM and ESC. All approved changes must be immediately incorporated into project planning and performance to ensure compliance with applicable laws and regulations.

5.0 Stormwater Pollution Prevention Plan (SWPPP) Requirements

5.1 Submittals

SWPPPs shall be submitted to the Smithsonian designated DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved SI Annual Standards and Specifications for SWM and ESC. SWPPPs shall include: an approved ***ESC Plan***, an approved ***SWM Plan***, and a ***P2 Plan*** for regulated land-disturbing activities. A SWPPP shall be developed, submitted to, and approved by the Smithsonian designated DEQ-Certified Plan Reviewer prior to submitting a registration statement to DEQ for permit coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities. The Smithsonian designated DEQ-Certified Plan Reviewer shall provide written notification that the submitted plan is complete within 10 working days of receiving the official submittal. Once the plan preparer has been notified that the plan is complete, the Plan Reviewer has 20 working days from the time of notification to complete the plan review. Final approval of a submitted plan must be provided to the plan preparer in a written notification.

5.1.1 ESC Plan Section

Site specific ESC Plans shall be prepared by the plan preparer per the requirements of the approved SI Annual Standards and Specifications for SWM and ESC. The ESC Plan shall be submitted, along with a completed ESC Plan Checklist, to Smithsonian designated DEQ-Certified Plan Reviewer for review and approval prior to initiating any land disturbing activities on the project site. **(See appendix 2 for the ESC Plan Checklist)**

The Smithsonian designated DEQ-Certified Plan Reviewer shall review the ESC Plan to ensure that it fulfills the requirements of the approved SI Annual Standards and Specifications for SWM and ESC, and applicable laws and regulations. The person responsible for carrying out the plan shall certify that they will perform the ESC measures described in the Plan. The person responsible for carrying out the plan shall identify the name of the individuals certified by DEQ as a RLD. All ESC Plans shall include a statement describing the maintenance responsibilities required for ESC controls used.

An approved ESC Plan prepared in accordance with the SI Annual Standards and Specifications for SWM and ESC shall:

- Control the volume and velocity of stormwater runoff within the site to minimize erosion;

- Control stormwater discharges, including peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and bank erosion;
- Minimize the amount of soil exposed during the construction activity;
- Minimize the disturbance of steep slopes;
- Minimize sediment discharges from the site in a manner that addresses: the amount, frequency, intensity, and duration of precipitation; the nature of resulting stormwater runoff; and soil characteristics, including the range of soil particle size present on the site;
- Provides and maintains natural buffers around surface waters, directs stormwater to vegetated areas to increase sediment removal, and maximizes stormwater infiltration (if feasible);
- Minimize soil compaction and preserve topsoil;
- Ensure that stabilization of disturbed areas will be initiated immediately whenever any clearing, grading, excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 7 days;
- Utilize outlet structures that withdraw stormwater from the surface when discharging from sediment basins or sediment traps.

Please reference Section 6.0 for more detailed information on Erosion & Sediment Control Plan contents and preparation requirements.

5.1.2 Stormwater Management Plan Section

Site specific SWM Plans shall be prepared by a designer with a professional signature and seal per the requirements of the approved SI Annual Standards and Specifications for SWM and ESC. The SWM Plan shall be submitted, along with a completed SWM Plan Review Checklist, to the Smithsonian designated DEQ-Certified Plan Reviewer for review and approval prior to initiating any land disturbing activities on the project site (**See Appendix 1 for SWM Plan Review Checklist**).

The SWM Plan shall be prepared in compliance with the requirements of the approved SI Annual Standards and Specifications for SWM and ESC, all applicable VSMP regulations and shall be developed in accordance with the following:

- Plan shall apply the SWM technical criteria set forth in this part to the entire land-disturbing activity;
- Plan shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff.

A complete SWM plan shall include:

- Information on the type of/location of stormwater discharge, information on the features to which stormwater is being discharged including surface waters or karst features if present, and predevelopment and post development drainage areas;
- Contact information including the name, address, telephone number, and email address of the owner and the tax reference number and parcel number of the property or properties affected;
- Narrative that describes current site conditions and final site conditions, including the increase in impervious area in acres;
- A general description of the proposed stormwater management facilities, and the methods for operations and maintenance once construction is completed;
- Information on the proposed stormwater management facilities, that includes: type of facility, location (geographic coordinates), acres treated, and the surface waters or karst features into which the facility will discharge. Provide specific product manufacturer, appropriate design storm, inspection frequency, maintenance, and other applicable product information. Use of proprietary BMPs may be further reviewed and approved on a project-specific basis;
- Hydrologic and hydraulic computations, including runoff characteristics, time of concentration and associated flow paths, peak velocities within each manmade open channel for the 10-year 24-hour storm, percent of impervious surfaces within each drainage area, runoff curve numbers, pollutants loads and load reduction requirements, and downstream analysis;
- Documentation and calculations verifying compliance with water quality/quantity requirements of VSMP regulations;
- Map that includes:
    - Vicinity;
    - Site topography;
    - Contributing drainage areas;
    - Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;
    - Soil types, geologic formations if karst features are

present in the area, forest cover, and other vegetative areas;
- Current land use including existing structures, roads, and locations of known utilities and easements;
- Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
- The limits of clearing and grading, and the proposed drainage patterns on the site;
- Proposed buildings, roads, parking areas, utilities, and stormwater management facilities;
- Proposed land use with calculation of the percentage of surface area to be adapted to various uses (planned locations of utilities, roads, easements);
- Representative cross-sectional and profile drawings and details of stormwater measures and conveyances;
- Final stabilization and landscaping plans.

5.1.3 P2 Plan Section

A P2 Plan addresses potential pollutant-generating activities that may affect the quality of stormwater discharges from construction activities. The P2 Plan shall:

- Identify potential pollutant-generating activities and pollutants expected to be exposed to stormwater;
- Describe the location where the potential pollutant-generating activities will occur;
- Identify all non-stormwater discharges, as authorized in section 9.3, that are or will be commingled with stormwater discharges from the construction activities, including any applicable support activity;
- Identify the person responsible for implementing the P2 practices for each pollutant-generating activity;
- Describe the practices and procedures implemented to:
  - Prevent, respond to, and report spills, leaks, and other releases, including stopping, containing, and cleaning up the release;
  - Prevent the discharge of spilled and leaked fuels and chemicals from fueling and maintenance operations;
  - Prevent the discharge of soaps, solvents, detergents, and wash water from construction materials;
  - Prevent the discharge of pollutants from equipment wash-down;
  - Direct concrete wash water into leak proof containers or settling basins; container or basin shall be designed to prevent overflows; hardened concrete washout

materials and other waste shall be removed and disposed of in a manner consistent with handling other construction waste; liquid concrete wastes shall be removed and disposed of in a manner consistent with handling of other construction waste waters and shall not be discharged to the surface waters or sanitary sewer;

- Prevent the discharge of pollutants from storage, handling, and disposal of construction products, materials, and waste including: asphalt sealants, copper flashing, roofing materials, grout, adhesives, and concrete mixtures, pesticides, herbicides, insecticides, fertilizers and landscape materials, packaging materials, masonry products, timber, pipe and electrical cuttings, plastics, Styrofoam, and other trash;
- Prevent the discharge of fuels, oils, and other petroleum products, hazardous and toxic wastes, and sanitary wastes;

- Describe procedures for providing P2 awareness of all applicable wastes, including wash water, disposal practices, and waste disposal locations to onsite personnel in order to comply with the conditions of the SWPPP and general permit.

6.0 Stormwater Management Plan Requirements

6.1 Submittals

SWM Plans shall be submitted to the Smithsonian designated DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved SI Annual Standards and Specifications for SWM and ESC. The SWM Plan shall contain sufficient information to demonstrate that the water quality and water quantity requirements have been adequately addressed for the proposed project required by current regulations and guidance documents. Each SWM Plan shall have a written portion known as the narrative and an illustrative portion known as a plan. A submittal will not be considered complete unless it includes a completed SWM Plan Review checklist (**See Appendix 1 for SWM Design Checklist**). The Smithsonian designated DEQ-Certified Plan Reviewer shall provide review and approval or denial within 15 days of receiving the official submittal.

The primary guidelines for determining the adequacy of a SWM Plan are the Virginia Stormwater Management Act under Title 62.1 of the Code of Virginia, the Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870), and the 2013 DEQ BMP Standards and Specifications.

6.2 Threshold Information

A land disturbing activity, as defined in section 1.3, with the following characteristics is required by the Virginia Stormwater Management Act (§ 62.1-44.15:34) to have an approved stormwater management plan:

- Land disturbing activities greater than or equal to one acre, or
- Part of a larger common plan of development or sale that is greater than or equal to one acre, or
- Land disturbing activity in the Chesapeake Bay Preservation Area greater than or equal to 2,500 square feet and less than one acre

6.3 Water Quality Requirements

Water quality compliance shall be determined through the use of the Virginia Runoff Reduction (VRRM) Spreadsheet Version 3.0 and the Virginia Runoff Reduction Method Instructions and Documentation provided by Virginia Stormwater BMP Clearinghouse. Per Virginia Stormwater Management Program Regulation (9VAC25-870-63) **(A)** in order to protect the quality of state waters and to control the discharge of stormwater pollutants from regulated activities, the following minimum design criteria and statewide standards for stormwater management shall be applied to the site:

- New development- The total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year, as calculated pursuant to 9VAC25-870-65.

- Development on prior developed lands:
  - For land-disturbing activities disturbing greater than or equal to one acre that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 20% below the predevelopment total phosphorus load.
  - For regulated land-disturbing activities disturbing less than one acre that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 10% below the predevelopment total phosphorus load.
  - For land-disturbing activities that result in a net increase in impervious cover over the predevelopment condition, the design criteria for new development shall be applied to the increased impervious area. Depending on the area of disturbance, the criteria of subdivisions a or b above, shall be applied to the remainder of the site.
  - In lieu of subdivision c of this subsection, the total phosphorus load of a linear development project occurring on prior developed lands shall be reduced 20% below the predevelopment total phosphorus load.
  - The total phosphorus load shall not be required to be reduced to below the applicable standard for new development unless a more stringent standard has been established by a locality.

(B) Compliance with subsection (A) of this section shall be determined in accordance with 9VAC25-870-65.

(C) Upon completion of the 2017 Chesapeake Bay Phase III Watershed Implementation Plan, the department shall review the water quality design criteria standards.

(D) Nothing in this section shall prohibit a locality's VSMP authority from establishing more stringent water quality design criteria requirements in accordance with § 62.1-44.15:33 of the Code of Virginia.

6.4 Step-By-Step Procedure for Preparing the SWM Plan

Data collection shall include:

- **Topography –** two small scale topographic maps of the project site (one showing pre-development conditions, and one showing post-development conditions) shall be prepared to show the existing contour elevations at consistent intervals that accurately depict site conditions.
- **Drainage Patterns** – all existing and proposed drainage

divides and swales on the project site should be located and marked on the topographic maps.

- **Soils** – major soil types and associated hydrologic soils groups on the project site shall be identified on a topographic map based on the most recent NRCS soils map.
- **Ground Cover** – existing and proposed vegetation such as trees, grass covered areas, and denuded areas shall be shown on the topographic maps.
- **Land Use –** Current and proposed land use, including tabulation of the percentage of impervious area, structures, roads, and locations of known and proposed utilities and easements shall be shown in the SWM plan. All existing stormwater management facilities impacted or within the vicinity of project.
- **Water Quality/Virginia Runoff Reduction Method –** A VRRM spreadsheet must be completed and placed on the SWM Plan for all projects that are regulated under Part IIB of the VSMP Regulations. Projects that are regulated under Part IIC of the VSMP Regulations (also known as "Grandfathered Projects") have the option of using the VRRM for water quality computations, but are not required. Provide specific product manufacturer, appropriate design storm, inspection frequency, maintenance, and other applicable product information. Use of proprietary BMPs may be further reviewed and approved on a project-specific basis. Grandfathered projects must adhere to the technical criteria for water quality in Part IIC of the VSMP Regulations.
- **Water Quantity –** All requirements within 9VAC25-870-66 must be addressed in the SWM Plan for projects regulated under Part IIB of the VSMP Regulations (or 9VAC25-870-97 through 9VAC25870-98 for Grandfathered Projects).
- **Downstream Analysis –** a downstream analysis shall be conducted in accordance with Minimum Standard 19 (MS-19) of the VESCH. Consider all sources of surface runoff and all sources of subsurface and groundwater flows that are converted to surface runoff. **(See Appendix 4 for MS-19 criteria.)**
- **Stormwater Quality and Quantity Practices –** provide information on all proposed stormwater management facilities, including: type of facility, geographic coordinates, acres treated, the surface waters into which the facility will discharge, and post-construction maintenance requirements. Ensure specified maintenance requirements are consistent with the Virginia Stormwater BMP Clearinghouse. If off-site compliance using nutrient credit purchase is utilized, a letter of availability from the offsite provider must be submitted with the SWM plan.

7.0 Erosion and Sediment Control Plan Requirements

7.1 Submittals

ESC Plans shall be submitted to the Smithsonian designated DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved SI Annual Standards and Specifications for SWM and ESC. The ESC Plan shall describe the potential for erosion and sedimentation during a land-disturbing activity. The plan shall contain sufficient information to demonstrate that erosion and sedimentation problems have been adequately addressed for the proposed project. The length and complexity of the ESC Plan shall be commensurate with the project size, site conditions, and potential for offsite/downstream damage. Each ESC Plan shall have a written portion known as the narrative and an illustrative portion known as a plan. A submittal will not be considered complete unless it includes a completed ESC Plan Review checklist (**See Appendix 2 for ESC Design Checklist**). The Smithsonian designated DEQ-Certified Plan Reviewer shall provide review and approval or denial within 15 days of receiving the official submittal.

The primary guidelines for determining the adequacy of an ESC Plan are the Virginia Erosion and Sediment Control Regulations and the VESCH. Each of the *Minimum Standards* in Section 40 of the Regulations shall be satisfied in the ESC Plan, unless a special variance is granted (Please see Section 8 for more information on variances, exceptions, and non-regulated activities). Chapter 3 of the VESCH contains minimum standards and specifications for ESC practices. These standards and specifications shall be adhered to during the design, installation, inspection, and maintenance of each control utilized.

7.2 Threshold Information

Land disturbing activities, as defined in section 1.3, greater than or equal to 10,000 square feet require an adequate Erosion and Sediment Control Plan. Activities taking place in the Chesapeake Bay Preservation Area require an ESC plan if disturbing 2,500 square feet or more.

7.3 Step-By-Step Procedure for Preparing the ESC Plan

Data collection shall include:

- **Topography –** a small scale topographic map of the project site shall be prepared to show the existing contour elevations at consistent intervals that accurately depicts site conditions.
- **Drainage Patterns** – all existing drainage patterns and swales on the project site should be located and marked on the topographic map.
- **Soils** – major soil types on the project site shall be identified on the topographic map.

- **Ground Cover** – existing vegetation such as trees, grass covered areas, and denuded areas shall be shown on the topographic map.
- **Adjacent Areas –** areas adjacent to the project site shall be identified on the topographic map.
- **Critical Area –** all critical areas on the project site should be located and marked on the topographic map.

7.4 Data Analysis

After the Data Collection is completed, the project planner will be able to better identify potentially critical erosion issues on the project site. The following information shall be considered during the Data Analysis:

7.3.1 Topography

The primary topographic issues to be considered are slope steepness and slope length. Because of the effect of accumulated runoff, erosion potential is greater on long, steep slopes. When the percent of a slope is determined, areas with similar steepness shall be outlined. Slope gradient can be grouped into three general ranges of soil erodibility:

- 0-7% slopes – low erosion potential
- 7-15% slopes – moderate erosion potential
- >15% slopes – high erosion potential

Within these slope gradients, the erosion potential becomes greater as the slope length increases Therefore, in determining potentially critical erosion areas, the project planner shall be aware of excessively long slopes. The potential erosion issue will become critical if the slope exceeds the following criteria:

- 0-7% slopes – 300 feet
- 7-15% slopes – 150 feet
- >15% slopes – 75 feet

7.3.2 Drainage Patterns

The existing drainage patterns on the project site, which consists of overland flow, swales, and depressions, and natural water courses, shall be identified in order to plan around critical areas where water will concentrate. Wherever possible, natural drainage ways should be used to convey stormwater runoff over and off the project site in order to avoid the expensive and problematic issues with constructing an artificial drainage system. Man-made ditches and conveyances can become part of the erosion problem if they are not properly designed and constructed.

7.3.3 Soils

Soils properties such as natural drainage, depth to bedrock, depth to seasonal water table, permeability, shrink-swell potential, texture, and erodibility should strongly influence land development decisions for a project.

7.3.4 Ground Cover

Ground cover is the most important factor in preventing erosion on a project site. Any existing vegetation that can be saved will be done to prevent erosion. Staging of construction shall be considered during project planning. Staging of construction involves the stabilization of one portion of the site prior to disturbing another portion. Temporary seeding, mulching, and/or stabilization matting of exposed areas can limit the time of exposure and reduce potential erosion issues for a project site.

7.3.5 Adjacent Areas

The analysis of adjacent areas shall focus on areas located downslope of the project site. Special attention shall be focused on downstream water courses that will receive direct runoff from the project site. The potential for sedimentation and downstream erosion shall be considered due to increase volume, velocity and peak flow rate of stormwater runoff from the project site (Please reference Minimum Standard 19 for further information).

7.3.6 Critical Areas

All critical areas are to be noted on the ESC plan and mentioned in the narrative. The narrative shall include a description of the site areas that have a potential serious erosion problem or that are sensitive to sediment impacts such as steep slopes, watercourses, wet weather/underground springs, etc.

7.5 Site Plan Development

After analyzing the data and determining the site dynamics, the project planner can develop a site plan (**See Appendix 2 for ESC Plan Review Checklist**). The following shall be considered when developing the site plan:

- **Fit development within terrain –** development of a project area shall be designed to work with the existing site conditions to avoid unnecessary land disturbance, erosion issues and costs. Slopes shall be designed to maximum of 2:1 to provide for final stabilization.
- **Avoid land disturbances in critical erosion areas on the project site –** land disturbances in critical erosion areas will require the installation of more costly control measures.

- **Cluster buildings together –** cluster buildings to minimize the total disturbed area, concentrate utility connection locations, provide more open space, lessen erodible areas, reduce runoff, and reduce development costs.
- **Minimize impervious areas –** minimize impervious surfaces such as parking lots and roads.
- **Utilize the natural drainage patterns onsite –** preserving the natural drainage system of a site can reduce the potential for downstream damage due to the installation of storm sewers or concrete channels.
- **Calculate runoff –** runoff calculations shall be done to determine the effect of the proposed development on the hydrologic system. Refer to Chapters 4 and 5 of VESCH for more information on the VESCR and calculation procedures. After the calculations have been completed, make the necessary changes to achieve compliance with runoff requirements.

7.6 Plan for Erosion and Sediment Controls

Once the site layout has been designed, a plan must be developed for controlling erosion and sedimentation from disturbed areas. The 19 ESC ***Minimum Standards*** located at 9VAC25-840-40 should serve as a guide for determining the level of controls applicable for any project. All erosion and sediment controls shall ensure consistency with the Virginia Erosion and Sediment Control Handbook (VESCH).

The following process shall be utilized for erosion and sediment control planning:

- **Determine the limits of clearing and grading –** decide which areas will be disturbed, particularly critical areas, in order to accommodate the proposed land disturbance.
- **Divide the site into drainage areas –** determine how stormwater runoff will travel across the developed project site; consider how erosion and sedimentation will be controlled in each drainage area prior to considering the entire project site.
- **Select the applicable erosion and sediment control practices –** erosion and sediment control practices can be divided into 3 subcategories: vegetative controls, structural controls, and BMPs. Vegetative and structural controls shall be selected and designed per the requirements of Chapter 3 of the VESCH. BMPs include construction management practices that can minimize the need for physical controls and reduce costs, if properly utilized:

    - **Vegetative controls –** preventing erosion shall be the top priority in preparing an ESC Plan; this is accomplished by

protecting the soil surface from raindrop impacts and overland flow of runoff. The most effective method for protecting the soil surface is to preserve the existing ground cover. Temporary seeding or mulching shall be utilized on the project site and staging of construction activities shall be conducted in order to minimize the amount of disturbed areas on a construction site at any one time. ESC Plans shall contain requirements for permanent stabilization of denuded areas and the selection of permanent vegetation shall include the following considerations: applicability to site conditions, establishment requirements, maintenance requirements, and aesthetics.

- **Structural controls –** often used as a second or third line of defense for capturing sediment before it leaves the project site; generally, more costly than vegetative measures, but usually necessary since not all disturbed areas can be protected with vegetative controls. Structural controls shall be selected, designed and installed per the requirements of the standards and specifications in Chapter 3 of the VESCH.
- **Best management practices (BMPs) –** good construction management practices can be as important as both vegetative and structural controls, with little to no costs involved. The following are examples of good construction BMPs for ESC:

    - Include ESC as an agenda item for the preconstruction meeting;
    - Stage or sequence construction to minimize the amount of time that areas remain not stabilized (work in a logical sequence across the project site, utilize temporary seeding immediately after grading, etc.);
    - Consider the time of year or seasons that the work will be conducted (success of vegetative practices, amounts of rainfall, the growing season, etc.)
    - Physically mark off the limits of land disturbance on the project site with tape, signs or other methods, so workers can clearly see the areas to be protected;
    - Develop and carry out a regular maintenance schedule for ESC practices;
    - Designate one individual responsible for implementing the ESC Plan on the project site.

- **Address MS-19 Criteria–** the site planner shall select appropriate stormwater management measures in order to satisfy the requirements of ***Minimum Standard 19***.

7.7 Prepare the ESC Plan

Once the planning work described in Sections 7.2 through 7.5 has been completed, it is time to consolidate the information into a project specific ESC Plan. The ESC Plan consists of two parts: the narrative and the site plan. The narrative explains the problems and solutions in writing, with all of the necessary supporting documentation. The site plan is the plan or drawing set that depicts the information contained within the narrative. Table 6-1 of the VESCH contains General Erosion and Sediment Control Notes (**See Appendix 4 for General ESC Notes**) is to be used as a guide during Plan development and shall be included as an attachment to the completed plan to be utilized by the site developer. The ESC Plan Checklist (**See Appendix 2 for ESC Design Checklist**) shall be used a guide by the site planner during ESC Plan development and also by the plan reviewer to determine if all of the required elements of the Plan have been covered. The ESC Checklist shall also be included as an attachment to the completed plan.

8.0 Inspection and Maintenance Requirements

8.1 SWPPP Inspections

8.1.1 SWPPP Inspection Personnel

Regular inspections required by the permit and project specific SWPPP shall be conducted by a competent person identified by the project manager or site operator. The person responsible for conducting regular SWPPP inspections for the permit holder must be able to:

- Inspect a site to ensure that the approved ESC plan is being properly implemented;
- Identify any maintenance needs and evaluate the effectiveness of ESC practices in minimizing erosion and sediment discharge;
- Inspect pollutant generating activities in the pollution prevention plan for the proper implementation, maintenance and effectiveness of pollution prevention measures; and
- Identify and document any pollutant generating activities not within the pollution prevention plan

8.1.2 SWPPP Inspection Schedule

Inspections shall be conducted at the following frequency:

- At least once every five business days; or
- At least once every ten business days and no later than 48 hours following a measurable storm event (0.25 inches of rain or greater over a 24-hour period). In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted no later than the next business day.
- Where areas have been temporarily stabilized or land-disturbing activities will be suspended due to continuous frozen ground conditions and stormwater discharges are unlikely, the inspection frequency may be reduced to once per month. If weather conditions (such as above freezing temperatures or rain or snow events) make discharges likely, the operator shall immediately resume the regular inspection frequency.

Inspection frequency for areas with impaired waters, exceptional waters, and TMDL limitations:

- At least once every four business days; or
- At least once every five business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted on the next business day.

Note that the inspection frequencies laid out in this section (8.1.2) are the responsibility of the CGP operator which may or may not be the AS&S holder.

8.1.3 SWPPP Inspection Requirements

The site operator designated on the permit is responsible for on-site and off-site inspections. Inspections shall be conducted by the qualified personnel identified in the SWPPP. The site operator is responsible for insuring that the qualified personnel conduct the inspections. **See Appendix 3 for SWPPP Inspection Report template**; as part of the inspection, the qualified personnel shall:

- Record the date/time of inspection and the date and rainfall amount of the most recent measurable storm event;
- Record the information and description of any discharges occurring at the time of the inspection;
- Record any land disturbing activities that have occurred outside of the approved Plan;
- Inspect the following for installation in accordance with the approved Plan, identification of any maintenance needs, and evaluation of effectiveness in minimizing sediment discharge, including the whether the control has been inappropriately or incorrectly used:
    - Perimeter erosion and sediment controls, such as silt fence;
    - Soil stockpiles and borrow areas for stabilization or sediment trapping measures;
    - Completed earthen structures, such as dams, dikes, ditches, and diversions for stabilization;
    - Cut and fill slopes;
    - Sediment basins and traps, sediment barriers, and other measures installed to control sediment discharge from stormwater;
    - Temporary or permanent channel, flume, or other slope drain structures installed to convey concentrated runoff down cut and fill slopes;
    - Storm inlets that have been made operational to ensure that sediment laden stormwater does not enter without first being filtered or similarly treated;
    - Construction vehicle access routes that intersect or access paved roads for minimizing sediment tracking.

- Inspect areas that have reached final grade or that will remain dormant for more than 7 days for initiation of stabilization activities;
- Inspect areas that have reached final grade or that will remain

dormant for more than 7 days for completion of stabilization activities within seven days of reaching grade or stopping work;

- Inspect for evidence that the approved erosion and sediment control plan prepared in accordance with approved annual standards and specifications has not been properly implemented; this includes but is not limited to:
    - Concentrated flows of stormwater in conveyances that have not been filtered, settled, or similarly treated prior to discharge;
    - Sediment laden or turbid flows of stormwater that have not been filtered or settled to remove sediments prior to discharge;
    - Sediment deposition in areas that drain to unprotected stormwater inlets or catch basins that discharge to surface waters (inlets and catch basins with failing sediment controls due to improper installation, lack of maintenance, or inadequate design are considered unprotected);
    - Sediment deposition on any property (including public and private streets) outside of the project are covered by the general permit;

- Required stabilization has not been initiated or completed on portion of the project site;
- Sediment basins without adequate wet or dry storage volume or sediment basins that allow the discharge of stormwater from below the surface of the wet storage portion of the basin;
- Sediment traps without adequate wet or dry storage or sediment traps that allow the discharge of stormwater from below the surface of the wet storage portion of the sediment trap;
- Land disturbance outside of the authorized area to be disturbed.
- Inspect pollution generating activities identified in the P2 Plan for proper implementation, maintenance, and effectiveness of the procedures and practices;
- Identify any pollutant generating activities not identified in the P2 Plan;
- Identify and document the presence of any evidence of the discharge of pollutants prohibited by the general permit, the SWM Plan, and applicable regulations;

8.1.4 SWPPP Inspection Documentation

See **Appendix 3** for a SWPPP inspection report template. This template shall be used in the case that the site specific SWPPP does not provide one.
Each inspection report shall include the following:

- Date/time of the inspection, and the date and rainfall amount of the most recent measurable storm event;

- Summary of the inspection findings;
- Location(s) of prohibited discharges;
- Location(s) of control measures that require maintenance;
- Location(s) of control measures that failed to operate as designed or proved inadequate or inappropriate for a particular location;
- Location(s) where any evidence identified of the SWPPP not being implemented as approved per the SI Annual Standards and Specifications for SWM and ESC and applicable regulations;
- Location(s) where any additional control measure is needed that did not exist at the time of inspection;
- List of corrective actions required as a result of the inspection or to maintain permit compliance;
- Documentation of any corrective action required from previous inspections that has not been implemented;
- Date and signature of the qualified personnel conducting the inspection; and
- Corrective actions identified as a result of an inspection shall be implemented as soon as practicable but no later than seven days after being observed or a longer period as approved by the Smithsonian designated DEQ-Certified Inspector.

8.2 ESC and SWM Inspections

8.2.1 ESC and SWM Inspection Personnel

Inspections required by the project specific ESC Plan shall be conducted by the Smithsonian designated DEQ-Certified ESC Inspector. Inspections required by the project specific SWM Plan shall be conducted by the Smithsonian designated DEQ-Certified SWM Inspector. Smithsonian's DEQ-Certified ESC and SWM Inspector shall also conduct inspections to ensure compliance with the approved SI Annual Standards and Specifications for SWM and ESC. Inspections conducted by the designated DEQ-certified inspector, under SI's oversight, are separate from the CGP operator's inspections. Refer to section 8.1.2 for the CGP operator inspection requirements.

8.2.2 ESC and SWM Inspection Schedule

Periodic inspections are required on all projects. The frequency of inspections will be as follows:

- During or immediately following the initial installation of erosion and sediment controls.
- Prior to removal of any erosion and sediment control devices
- At the completion of the project prior to the release of any performance bonds and/or permit termination.
- Upon request by the owner or site operator
- Monthly inspections at the discretion of the Inspector
- SWPPPs are to be inspected at the beginning of the project

8.2.3 ESC and SWM Inspection Requirements

The Smithsonian designated DEQ-Certified SWM and ESC Inspector and project manager designated DEQ-Certified SWM and ESC Inspector shall inspect the land-disturbing activity during construction for: compliance with the approved ESC Plan; compliance with the approved SWM Plan; development, update, and implementation of a P2 Plan; and development and implementation of any additional control measures necessary to address a TMDL; ensure that stormwater management facilities are being adequately maintained as designed after completion of the land-disturbing activities. **See Appendix 3 for an Environmental Compliance Report template**; as part of the inspection, the qualified personnel shall:

- Record the date/time of inspection and the date and rainfall amount of the most recent measurable storm event;
- Record the information and description of any discharges occurring at the time of the inspection;
- Record any land disturbing activities that have occurred outside of the approved ESC Plan;
- Inspect the following for installation in accordance with the approved ESC Plan, identification of any maintenance needs, and evaluation of effectiveness in minimizing sediment discharge, including whether the control has been inappropriately or incorrectly used:
    - Perimeter erosion and sediment controls, such as silt fence;
    - Soil stockpiles and borrow areas for stabilization or sediment trapping measures;
    - Completed earthen structures, such as dams, dikes, ditches, and diversions for stabilization;
    - Cut and fill slopes;
    - Sediment basins and traps, sediment barriers, and other measures installed to control sediment discharge from stormwater;
    - Temporary or permanent channel, flume, or other slope drain structures installed to convey concentrated runoff down cut and fill slopes;
    - Storm inlets that have been made operational to ensure that sediment laden stormwater does not enter without first being filtered or similarly treated;
    - Construction vehicle access routes that intersect or access paved roads for minimizing sediment tracking;
    - Inspect areas that have reached final grade or that will remain dormant for more than 7 days for initiation of stabilization activities;
    - Inspect areas that have reached final grade or that will remain dormant for more than 7 days for completion of stabilization

activities within seven days of reaching grade or stopping work;

- Inspect for evidence that the approved ESC Plan prepared in accordance with approved annual standards and specifications has not been properly implemented; this includes but is not limited to:
- Concentrated flows of stormwater in conveyances that have not been filtered, settled, or similarly treated prior to discharge;
- Sediment laden or turbid flows of stormwater that have not been filtered or settled to remove sediments prior to discharge;
- Sediment deposition in areas that drain to unprotected stormwater inlets or catch basins that discharge to surface waters (inlets and catch basins with failing sediment controls due to improper installation, lack of maintenance, or inadequate design are considered unprotected);
- Sediment deposition on any property (including public and private streets) outside of the project are covered by the general permit;
- Required stabilization has not been initiated or completed on portion of the project site;
- Sediment basins without adequate wet or dry storage volume or sediment basins that allow the discharge of stormwater from below the surface of the wet storage portion of the basin;
- Sediment traps without adequate wet or dry storage or sediment traps that allow the discharge of stormwater from below the surface of the wet storage portion of the sediment trap;
- Land disturbance outside of the authorized area to be disturbed;
- Ensure that all ESC measures are designed, installed, and functioning as required in Chapter 3 of the VESCH;
- Utilize the ***19 Minimum Standards*** as a checklist guide while conducting inspections;

8.2.4 ESC and SWM Inspection Documentation

Provide documentation in a written report or inspection log. **See Appendix 3 for an Environmental Compliance Report template.** reports shall contain:

- Date and time of inspection.
- Date and rainfall amount of the last measurable storm event.
- Comments concerning compliance or non-compliance.
- Notes on any coordination with project manager, site superintendent, responsible land disturber, regulatory agencies as related to the project.

- Description of current stages of construction, stabilization requirements and any major changes planned prior to next scheduled inspection.
- Signature of qualified person conducting inspection and date of inspection.

8.3 Maintenance Requirements

Section 9 VAC 25-870-112 of the VSMP regulations require the provision of long-term maintenance responsibilities of SWM facilities and other techniques specified to manage the quality and quantity of runoff. Such requirements shall be set forth prior to State permit termination or earlier as required by the approved SI Annual Standards and Specifications for SWM and ESC and applicable regulations. At a minimum, the provisions shall:

- Be submitted to the Smithsonian designated DEQ-Certified Program Administrator for review and approval prior to the approval of the SWM Plan;
- Be stated to run with the land;
- Provide for all necessary access to the property for purposes of maintenance and regulatory inspections;
- Provide for inspections and maintenance and the submission of inspection and maintenance reports to the Smithsonian DEQ-Certified SWM Inspector;
- Be enforceable by all appropriate governmental parties.

At the discretion of the Smithsonian designated DEQ-Certified Program Administrator, such recorded instruments need not be required for stormwater management facilities designated to treat stormwater runoff primarily from an individual residential lot on which they are located, provided it is demonstrated to the satisfaction of the VSMP authority that future maintenance of such facilities will be addressed through an enforceable mechanism at the discretion of the VSMP authority

The following information should be printed on the approved stormwater management plan for state and federal projects:

- A description of the requirements for maintenance and maintenance inspection of the stormwater management facilities and a recommended schedule of maintenance inspection and maintenance.
- The identification of a person or persons who will be responsible for maintenance inspection and maintenance.
- The maintenance inspection schedule and maintenance requirements should be in accordance with the Virginia BMP Clearinghouse, the Virginia SWM Handbook, the MS4 permit (if applicable) and/or the manufacturer's specifications.

9.0 Variances, Exceptions, Prohibited Stormwater Discharges, Authorized Non-Stormwater Discharges and Enforcement

9.1 Requests for Variances and Exceptions

Variances and exceptions must ensure protection of offsite properties, and maintain compliance with existing regulations, along with the requirements of the approved SI Annual Standards and Specifications for SWM and ESC. A written variance request must be submitted to the DEQ Central Office for review and approval. The request shall include reasoning for the requested variance and a description of the site-specific conditions that require variance or exception. The request shall also include a description of the alternative SWM or ESC practice to be utilized and justifications that the alternative practice complies with all applicable regulations. It is strongly recommended that all requests for variances and exceptions be submitted as early as possible in the project planning process in order to accommodate project scheduling. SI may (at DEQ's discretion) be required to produce documentation to demonstrate the applicability of variance requests.

A variance may be granted under the following conditions:

- At the time of plan submission, an applicant may request a variance to become part of an approved SWM or ESC Plan. Variances that are approved by DEQ Central Office must be documented in the approved plan.
- During construction, the person responsible for implementing the approved plan may request a variance.
- The Smithsonian designated DEQ-Certified Program Administrator will consider variance requests judiciously by considering the need of the applicant and the need to protect off-site properties and resources from damage. All variance requests received by the Smithsonian DEQ- Certified Program Administrator will be forwarded to DEQ Central Office for review and approval.

9.2 Prohibited Stormwater Discharges

All discharges covered by the General VPDES Permit for Discharges of Stormwater from Construction Activities shall be composed entirely of stormwater associated with construction activities; all other discharges, including the following, are prohibited:

- Wastewater from washout of concrete or grout;
- Wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;

- Oils, toxic substances, or hazardous substances from spills or other releases;
- Soaps, solvents, or detergents;
- Post-construction discharges.

9.3 Authorized Non-Stormwater Discharges

The following non-stormwater discharges from construction activities are authorized by the General VPDES Permit for Discharges of Stormwater from Construction Activities:

- Discharges from firefighting activities;
- Fire hydrant flushing;
- Water used to control dust that has been filtered, settled, or similarly treated prior to discharge;
- Uncontaminated potable water sources, including uncontaminated water line flushing;
- Routine external building wash down where soaps, solvents, or detergents have not been used and the wash water has been filtered, settled, or similarly treated prior to discharge;
- Pavement wash water where spills or leaks of toxic or hazardous materials have not occurred; where soaps, solvents or detergents have not been used; and where the wash water has been filtered, settled, or similarly treated prior to discharge;
- Uncontaminated air conditioning or compressor condensate;
- Uncontaminated groundwater or spring water;
- Foundation or footing drains where flows are not contaminated with process materials such as solvents;
- Uncontaminated excavation dewatering, including dewatering of trenches and excavations that have been filtered, settled, or similarly treated prior to discharge;
- Landscape irrigation.

9.4 Enforcement Policies

Violations shall be documented in the *Environmental Compliance Report*, including photographs, descriptions, and necessary corrective actions. If a violation continues to be repeated, then a formal Notice of Non-Compliance will be issued, and DEQ notified. At the discretion of the SI Designated DEQ-Certified Inspector, the VSMP may be suspended and/or revoked; at which time all land disturbing activity must cease until the violation(s) of the plan or permit has ceased, corrective action completed, and any related environmental or property damages abated. Alternatively, the SI Designated DEQ-Certified Inspector also has the option to contract with a 3rd party to install and maintain the Erosion and Sediment Control and/or Stormwater Management measures in accordance with the approved plan, complete any

necessary corrective actions, and abate any related damages. Once the site is stabilized to the satisfaction of the SI Designated DEQ-Certified Inspector, site work may resume. All associated costs will be back-charged to the Contractor.

10.0 Permit Termination

Project completion is defined as the achievement of final stabilization and verification of final product according to approved plans. The contractor will recommend to the SI Designated DEQ-Certified Inspector that final stabilization has been achieved. Per MS-3 a permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion. Per MS-18 all temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the DEQ-Certified Inspector. Trapped sediments and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation. Once the SI Designated DEQ-Certified Inspector concurs and final project as-builts are received in the required formats (Civil 3D, PDF, BIM, Hard Copy, etc.), the Notice of Termination form may be submitted to DEQ for the project to be closed-out.

(See Appendix 6 for the Permit Request for Termination)

APPENDIX 1 – STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST

PLAN SUBMITTER'S CHECKLIST FOR STORMWATER MANAGEMENT PLANS

Please fill in all blanks and **please reference the plan sheets/pages where the information may be found,** where appropriate, or write N/A by items that are not applicable.

GENERAL

Plan Submission Date _____
Project Name _____
Site Address _____
Principal Designer _____ Phone Number _____
Principal Designer E-mail Address_____
Total Disturbed Area Figure_____

☐ Professional's seal - The designer's original seal, signature, and date are required on the *cover* sheet of each Narrative and each set of Plan Sheets. A facsimile is acceptable for subsequent Plan Sheets.

☐ Number of plan sets – One full-size hard-copy of SWM plans may be submitted initially. Two full-size sets and One half-size set will be required for approval. Distribution of the approved plans will be as follows:

1 Full Size – Site Operator/Contractor
1 Full Size – Smithsonian Institution Construction Office
1 Half Size – ESC/SWM Inspector
(Note: An electronic copy of the approved stamped plans will be sent to the design engineer for their records.)

☐ Variances and Exceptions - Exceptions requested are governed by Section 9VAC25-870-57 of the *Virginia Stormwater Management Regulations*.

☐ Grandfathering - Attach supporting documentation consistent with the requirements of Section 9VAC25-870-48 of the *Virginia Stormwater Management Regulations*.

☐ Offsite Compliance – Attach letter of availability from the off-site provider as governed by Section 9VAC25-870-55 of the *Virginia Stormwater Management Regulations*.

CHECKLIST PREPARER

I certify that I am a professional in adherence to all minimum standards and requirements pertaining to the practice of that profession in accordance with Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia and attendant regulations. By signing this checklist, I am certifying that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete.

SIGNATURE _____

PRINTED NAME _____
QUALIFICATIONS _____
DATE _____

SITE PLANS

Please reference the plan sheet numbers where specific information may be found in the blanks below.

Sheet #:

_____ Common address and legal description of the site, including the tax reference number(s) and parcel number(s) of the property or properties affected.

Sheet #:

_____ A narrative that includes a description of current site conditions and proposed development and final site conditions, including proposed use of environmental site design techniques and practices, stormwater control measures, relevant information pertaining to long-term maintenance of these measures, and a construction schedule. The narrative must also include the existing impervious area (in acres and square feet) and proposed impervious area (in acres and square feet).

Sheet #:

_____ Existing and proposed mapping and plans (recommended scale of 1" = 50', or greater detail), which illustrates the following at a minimum:

☐ North arrow
☐ Legend
☐ Vicinity map
☐ Existing and proposed topography (minimum of 2-foot contours recommended)
☐ Property lines
☐ Perennial and intermittent streams
☐ Mapping of predominant soils from USDA soils surveys as well as the location of any site-specific test bore hole investigations that may have been conducted and information identifying the hydrologic characteristics and structural properties of soils used in the installation of stormwater management facilities
☐ Boundaries of existing predominant vegetation and proposed limits of clearing and grading
☐ Location and boundaries of natural feature protection and conservation areas (e.g., wetlands, lakes, ponds, aquifers, public drinking water supplies, etc.) and applicable setbacks (e.g., stream buffers, drinking water well setbacks, septic drainfield setbacks, building setbacks, etc.)
☐ Identification of any on-site or adjacent water bodies included on the Virginia 303(d) list of impaired waters
☐ Current land use and location of existing and proposed roads, buildings, parking lots and other impervious areas
☐ Location and description of any planned demolition of existing structures, roads, etc.
☐ Proposed land use(s) with a tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, parking lots, stormwater management facilities, and easements
☐ Location of existing and proposed utilities [e.g., water (including wells), sewer (including septic systems), gas, electric, telecommunications, cable TV, etc.] and easements
☐ Earthwork specifications
☐ Show the BMP name, geographic coordinates and design of both structural and non-structural stormwater control measures, including maintenance access and limits of disturbance
☐ Storm drainage plans for site areas not draining to any BMP(s)
☐ Location of existing and proposed conveyance systems, such as storm drains, inlets, catch basins, channels, lateral groundwater movement interceptors (French drains, agric. tile drains, etc.), swales, and areas of overland flow, including grades, dimensions, and direction of flow

☐ Final drainage patterns and flow paths
☐ Location of floodplain/floodway limits and relationship of site to upstream and downstream properties and drainage systems
☐ Location of all contributing drainage areas and points of stormwater discharge, receiving surface waters or karst features into which stormwater discharges, the pre-development and post-development conditions for drainage areas, and the potential impacts of site stormwater on adjoining parcels
☐ Location and dimensions of proposed channel modifications, such as bridge or culvert crossings
☐ Final stabilization and landscaping plans

Sheet #:
_____ Hydrologic and hydraulic analysis, including the following:

☐ Site map with locations of design points and drainage areas (size in acres) for runoff calculations
☐ Identification and calculation of stormwater site design credits, if any apply
☐ Summary description of the water quantity and water quality compliance strategy. (Note: Please include the Virginia Runoff Reduction Method Spreadsheet)
☐ Time of concentration (and associated flow paths)
☐ Imperviousness of the entire site and each drainage area
☐ NRCS runoff curve numbers or volumetric runoff coefficients
☐ A hydrologic analysis for the existing (pre-development) conditions, including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations
☐ A hydrologic analysis for the proposed (post-development) conditions, including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations
☐ Hydrologic and hydraulic analysis of the stormwater management system for all applicable design storms
☐ Pollution load and load reduction requirements and calculations
☐ Rip rap and outfall protection calculations at all concentrated discharge locations
☐ Final good engineering and sizing calculations for stormwater control measures, including contributing drainage areas, storage, and outlet configurations, verifying compliance with the water quality and water quantity requirements of the regulations
☐ Stage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities
☐ Final analysis of the potential downstream impacts/effects of the project, where necessary
☐ Downstream analysis, where detention is proposed
☐ Dam safety and breach analysis, where necessary

Sheet #:
_____ Representative cross-section and profile drawings and details of stormwater control measures
..... and conveyances which include the following:
☐ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.)
☐ Design water surface elevations
☐ Structural details of BMP designs, outlet structures, embankments, spillways, grade control structures, conveyance channels, etc.

Sheet #:
_____ Applicable construction and material specifications, including references to applicable material and construction standards (ASTM, etc.)

Sheet #:
_____ Landscaping plans for stormwater control measures and any site reforestation or revegetation

Sheet #:
_____ Long term operations and maintenance plan/agreement as governed by 9VAC25-870-112 of the Virginia Stormwater Management Program Regulations.

Sheet #:
_____ Evidence of acquisition of all applicable local and non-local permits; as well as Nutrient Credit availability and purchase letters, if applicable.

Sheet #:
_____ Applicable supporting documents and studies (e.g., infiltration tests, geotechnical investigations, TMDLs, flood studies, etc.)

_____ Other required permits: _____

APPENDIX 2 – EROSION & SEDIMENT CONTROL PLAN REVIEW CHECKLIST

PLAN SUBMITTER'S CHECKLIST

FOR EROSION AND SEDIMENT CONTROL PLANS

Please fill in all blanks and reference the plan sheets/pages where the information may be found, where appropriate, or write N/A by items that are not applicable.

GENERAL

Plan Submission Date: _____
Project Name _____
Site Address _____
Principal Designer _____ Phone Number _____
Principal Designer E-mail Address_____
Total Disturbed Area Figure_____

_____ Complete set of plans- Include all sheets pertaining to the site grading and stormwater and any activities impacting erosion and sediment control and drainage:

Sheet #:
_____☐ Existing conditions
_____☐ Demolition
_____☐ Site grading
_____☐ Erosion and sediment control
_____☐ Storm sewer systems
_____☐ Stormwater management facilities
_____☐ Utility layout
_____☐ Landscaping
_____☐ On-site and off-site borrow and disposal areas that do not have separate approved ESC Plans

_____ Professional's seal - The designer's original seal, signature, and date are required on the *cover* sheet of each Narrative and each set of Plan Sheets. A facsimile is acceptable for subsequent Plan Sheets.

_____ Number of plan sets – Minimum one full-size hard copy set of ESC Plans should be submitted for review. Once plans are ready for approval, two full-size sets and one half-size will be required.

_____ Variances - Variances requested at the time of plan submission are governed by Section 9VAC25-840-50 of the *Virginia Erosion and Sediment Control Regulations*.

_____ Certified Responsible Land Disturber (RLD) - A certified RLD is required during all stages of construction, from the initial land disturbance through final site stabilization**. The name of the project RLD must be provided before any land disturbance may begin.** Notify DEQ in a timely manner if the RLD changes during the course of the project.

CHECKLIST PREPARER

I certify that I am a professional in adherence to all minimum standards and requirements pertaining to the practice of that profession in accordance with Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia and attendant regulations. By signing this checklist I am certifying that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete.

SIGNATURE _____

PRINTED NAME _____

QUALIFICATIONS _____

DATE _____

NARRATIVE

Please reference plan sheet numbers where the information may be found.

Sheet #:
_____ Project description - Briefly describe the nature and purpose of the land-disturbing activity. Provide the area (acres) to be disturbed.

Sheet #:
_____ Existing site conditions - A description of the existing topography (% slopes), ground cover, and drainage (on-site and receiving channels).

Sheet #:
_____ Adjacent areas - A description of all neighboring areas such as residential developments, agricultural areas, streams, lakes, roads, etc., that might be affected by the land disturbance.

Sheet #:
_____ Off-site areas - Describe any off-site land-disturbing activities that may occur (borrow sites, disposal areas, easements, etc.). Identify the Owner of the off-site area and the entity responsible for plan review. Include a statement that any off-site land-disturbing activity associated with the project must have an approved ESC Plan. Submit documentation of the approved ESC Plan for each of these sites.

Sheet #:
_____ Soils - Provide a description of the soils on the site, giving such information as soil name, mapping unit, erodibility, permeability, surface runoff, and a *brief* description of depth, texture and soil structure. Show the site location on the Soil Survey, if it is available. Include a plan showing the boundaries of each soil type on the development site.

Sheet #:
_____ Critical areas - A description of areas on the site that have potentially serious erosion problems or that are sensitive to sediment impacts (e.g., steep slopes, watercourses, wet weather / underground springs, etc.).

Sheet #:
_____ Erosion and sediment control measures - A description of the structural and vegetative methods that will be used to control erosion and sedimentation on the site. Controls should satisfy applicable minimum standards and specifications in Chapter 3 of the 1992 *Virginia Erosion and Sediment Control Handbook* (VESCH) or more stringent local requirements.

Sheet #:
_____ Management strategies / Sequence of construction - Address management strategies, the sequence of construction, and any phasing of installation of ESC measures.

Sheet #:
_____ Permanent stabilization - A brief description, including specifications, of how the site will be stabilized after construction is completed.

Sheet #:
_____ Maintenance of ESC measures - A schedule of regular inspections, maintenance, and repair of erosion and sediment control structures should be set forth.

Sheet #:
_____ Calculations for temporary erosion and sediment control measures - For each temporary ESC measure, provide the calculations required by the standards and specifications.

Sheet #:
_____ Stormwater management considerations - Will the development of the site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control stormwater runoff, including during construction.

Sheet #:
_____ Specifications / Detail Drawings for erosion and sediment control measures - For each erosion and sediment control measure employed in the plan, include, at a minimum, the detail from the standard and specification in the VESCH or more stringent local requirements. Include any approved variances or revisions to the standards and specifications.

Sheet #:
_____ Specifications for stormwater and stormwater management structures - Provide specifications for stormwater and stormwater management structures, i.e., pipe materials, pipe bedding, stormwater structures.

SITE PLAN
Please reference plan sheet numbers where the information may be found.

Sheet #:
_____ Vicinity map - A small map locating the site in relation to the surrounding area. Include any landmarks that might assist in locating the site.

Sheet #:
_____ Indicate north - The direction of north in relation to the site.

Sheet #:
_____ Off-site areas - Include any off-site land-disturbing activities (e.g., borrow sites, disposal areas, etc.) not covered by a separate approved ESC Plan.

Sheet #:
_____ Legend - Provide a complete listing of all ESC measures used, including the VESCH uniform code symbol and the standard and specification number. Include any other items necessary to identify pertinent features in the plan.

Sheet #:
_____ Property lines and easements - Show all property and easement lines. For each adjacent property, list the deed book and page number and the property owner's name and address.

Sheet #:
_____ Existing vegetation – Show the existing tree lines, grassed areas, or unique vegetation.

Sheet #:
_____ Limits of clearing and grading – Delineate all areas that are to be cleared and graded.

Sheet #:
_____ Protection of areas not being cleared - Fencing or other measures to protect areas that are not to be disturbed on the site.

Sheet #:
_____ Critical areas – Note all critical areas on the plan.

Sheet #:
_____ Existing contours – Show the existing contours of the site.

Sheet #:
_____ Final contours and elevations – Show changes to the existing contours, including final drainage patterns.

Sheet #:
_____ Site development – Show all improvements such as buildings, parking lots, access roads, utility construction, etc. Show all physical items that could affect or be affected by erosion, sediment, and drainage.

Sheet #:
_____ Location of practices - The locations of erosion and sediment control and stormwater management practices used on the site. Use the standard symbols and abbreviations in Chapter 3 of the VESCH.

Sheet #:
_____ Adequate Conveyances – Ensure that stormwater conveyances with adequate capacity and adequate erosion resistance have been for provided all on-site concentrated stormwater runoff. Off-site channels that receive runoff from the site, including those receiving runoff from stormwater management facilities, must be adequate. Increased volumes of sheet flows must be diverted to a stable outlet, adequate channel, pipe or pipe system, or a stormwater management facility.

☐ Provide exhibits showing the drainage divides, the direction of flow, and the size (acreage) of each of the site drainage areas that discharge runoff off-site, both existing and proposed.
☐ Provide calculations for pre- and post-development runoff from these drainage areas.
☐ Ensure that Minimum Standard 19 is satisfied for each off-site receiving channel, including those that receive runoff from stormwater management facilities.
☐ Provide calculations for the design of each permanent stormwater management facility.
☐ Ensure that increased volumes of sheet flows are diverted to a stable outlet, to an adequate channel, pipe or pipe system, or to a stormwater management facility.
☐ Provide adequacy calculations for all on-site stormwater conveyances.

Sheet #:

_____ Calculations for permanent stormwater conveyances - For each permanent stormwater conveyance or structure, provide the following design calculations, as applicable:

- ☐ Drainage area map with time of concentration (T_C) path shown
- ☐ T_C calculation/nomograph
- ☐ Locality IDF curve
- ☐ Composite runoff coefficient or RCN calculation
- ☐ Peak runoff calculations
- ☐ Stormwater conveyance channel design calculations
- ☐ Storm drain and storm sewer system design calculations
- ☐ Hydraulic Grade Line if any pipe in the system is more than 90% full for a 10-year storm
- ☐ Culvert design calculations
- ☐ Drop inlet backwater calculations
- ☐ Curb inlet length calculations

Sheet #:

_____ Direction of Flow for Conveyances - Indicate the direction of flow for all stormwater conveyances (storm drains, stormwater conveyance channels).

Sheet #:

_____ Storm Drain Profiles - Provide profiles of all storm drains except roof drains. If the type of pipe (RCP, CMP, HDPE, etc.) is not called out on the profiles, then the most conservative pipe material that may be specified for the project must be used in the adequacy calculations.

MINIMUM STANDARDS

Sheet #:
_____ **Minimum Standards - All Minimum Standards must be addressed.**

Yes	No	NA		
[]	[]	[]	MS-1	Have temporary and permanent stabilization been addressed in the narrative?
[]	[]	[]		Are practices shown on the plan?
[]	[]	[]		Temporary and permanent seed specifications?
[]	[]	[]		Lime and fertilizer?
[]	[]	[]		Mulching?
[]	[]	[]		Blankets/Matting?
[]	[]	[]		Pavement/Construction Road Stabilization?
[]	[]	[]	MS-2	Has stabilization of soil stockpiles, borrow areas, and disposal areas been addressed in the narrative and on the plan?
[]	[]	[]		Have sediment trapping measures been provided?
[]	[]	[]	MS-3	Has the establishment and maintenance of permanent vegetative stabilization been addressed?
[]	[]	[]	MS-4	Does the plan specifically state that sediment-trapping facilities shall be constructed as a first step in land-disturbing activities?
[]	[]	[]	MS-5	Does the plan specifically state that stabilization of earthen structures is required immediately after installation? Is this noted for each measure on the plan?
[]	[]	[]	MS-6	Are sediment traps and sediment basins specified where needed and designed to the standard and specification?
[]	[]	[]	MS-7	Have the design and temporary/permanent stabilization of cut and fill slopes been adequately addressed? Is Surface Roughening provided for slopes steeper than 3:1?
[]	[]	[]	MS-8	Have adequate temporary or permanent conveyances (paved flumes, channels, slope drains) been provided for concentrated stormwater runoff on cut and fill slopes?
[]	[]	[]	MS-9	Has water seeping from a slope face been addressed (e.g., subsurface drains)?
[]	[]	[]	MS-10	Is adequate inlet protection provided for all operational storm drain and culvert inlets?

Yes	No	NA		
[]	[]	[]	MS-11	Are adequate outlet protection and/or channel linings provided for all stormwater conveyance channels and receiving channels? Is there a schedule indicating:
[]	[]	[]		Dimensions of the outlet protection? Lining? Size of riprap?
[]	[]	[]		Cross section and slope of the channels? Type of lining? Size of riprap, if used?
[]	[]	[]	MS-12	Are in-stream protection measures required so that channel impacts are minimized?
[]	[]	[]	MS-13	Are temporary stream crossings of non-erodible material required where applicable?
[]	[]	[]	MS-14	Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being followed?
[]	[]	[]	MS-15	Has immediate restabilization of areas subject to in-stream construction (bed and banks) been adequately addressed?
[]	[]	[]	MS-16	Have disturbances from underground utility line installations been addressed?
[]	[]	[]		No more than 500 linear feet of trench open at one time?
[]	[]	[]		Effluent from dewatering filtered or passed through a sediment-trapping device?
[]	[]	[]		Proper backfill, compaction, and restabilization?
[]	[]	[]	MS-17	Is the transport of soil and mud onto public roadways properly controlled? (i.e., Construction Entrances, wash racks, transport of sediment to a trapping facility, cleaning of roadways at the end of each day, no washing before sweeping and shoveling)
[]	[]	[]	MS-18	Has the removal of temporary practices been addressed?
[]	[]	[]		Have the removal of accumulated sediment and the final stabilization of the resulting disturbed areas been addressed?
[]	[]	[]	MS-19	Are properties and waterways downstream from development adequately protected from sediment deposition, erosion, and damage due to increases in volume, velocity and peak flow rate of stormwater runoff? Have adequate channels been provided on-site?

APPENDIX 3 – SWPPP INSPECTION REPORT TEMPLATE
AND
STORMWATER MANAGEMENT/EROSION & SEDIMENT CONTROL INSPECTION REPORT EXAMPLE FORM

The following inspection report template is to be used for ESC and SWM inspections, as described in section 8.2, and is required to be signed by a DEQ-certified inspector.

SWPPP INSPECTION REPORT

8.0 Inspections & Corrective Action Log (make additional copies as necessary)

Qualified Inspector

Company/Organization: _____
Name: _____
Telephone Number: _____
Qualifications: _____

Inspection Schedule

Discharges to surface waters: [Choose one]

☐ Once every 5 business days; or
☐ Once every 10 business days and no later than 48 hours following a measurable storm event.

Inspection Date: _____

Measurable Storm Event [Insert Date & Rainfall Amount of Last Measurable Storm Event (if applicable)]: _____

Best Management Practices (BMPs)	In Compliance with SWPPP?	Corrective Action Needed; Responsible Party	Date Corrective Action Taken
Erosion & Sediment Controls (Section 4.0)	☐ Yes ☐ No		
Pollution Prevention Practices (Section 5.0)	☐ Yes ☐ No		
Stormwater Management Controls (Section 6.0)	☐ Yes ☐ No ☐ NA		

Certification

"I certify under penalty of law that I have read and understand this document and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Operator Name: _____ Inspector Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

Reply To:
Smithsonian Institution
c/o Bowman Consulting Group, Ltd
13461 Sunrise Valley Drive, Suite 500
Herndon, VA 20171
PHONE: (703) 464-1000 FAX: (703) 481-9720

Smithsonian Institution

Environmental Compliance Report

Project Name: _____ Project Location: _____
Project Owner: Smithsonian Institution Permit No.: _____
Project Operator: _____ Insp. Date/Time: _____ T:
Inspector: _____ Weather: _____

Documentation Onsite: SWPPP/SWPPP Location: ☐ VSMP Permit: ☐ Pollution Prevention Map: ☐
Approved ESC Plans: ☐ Approved SWM Plans: ☐

STAGE OF CONSTRUCTION

Pre-Cons. Conference ☐ Building Construction ☐ Construction SWM Facilities ☐
Clearing & Grubbing ☐ Finish Grading ☐ Maintenance of SWM Facilities ☐
Rough Grading ☐ Final Stabilization ☐ Other: Road & Drainage Installation ☐

State/Local Regulation (1) (citation)	*Violation*		*Practice/Problem/Violation Location and Description (2)*	*Corrective Action Required, Completed, and/or Recommendations/Comments*	Reference Image
	Initial	Repeat			

Additional Comments:

(1) Refers to applicable regulation found in the most recent publication of the Virginia Erosion and Sediment Control Regulations (9VAC25-840), Virginia Stormwater Management Regulations (9VAC25-870), or local ESC/SWM ordinance

(2) Note whether or not off-site damage resulting from the practice, problem, or violation was evident during the inspection.

REQUIRED CORRECTIVE ACTION DEADLINE DATE: _____ **Re-inspection +/-:** _____

The required corrective action deadline date applies to all violations noted on this report. If listed violation(s) currently constitute non-compliance and/or required corrective actions are not completed by the deadline date, a **NOTICE TO COMPLY**, **STOP WORK ORDER**, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance on the above project.

Inspector: _____ _____ _____
Signature Date

Hand deliver, fax, or email written notification to all appropriate parties within 24 hours of inspection date.

Report Recipient: _____ _____ _____
Name Email or Address Date

Copy 1-Onsite Project Representative Copy 2-Project Authority Copy 3-DEQ Project File

Page 1 of 2

Reply To:
Smithsonian Institution
c/o Bowman Consulting Group, Ltd
13461 Sunrise Valley Drive, Suite 500
Herndon, VA 20171
PHONE: (703) 464-1000 FAX: (703) 481-9720

Smithsonian Institution

Figure 1

Figure 2

Figure 3

Figure 4

APPENDIX 4 – GENERAL EROSION & SEDIMENT CONTROL NOTES

TABLE 6-1

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 9VAC25-840 Erosion and Sediment Control Regulations.

ES-2: The plan approving authority must be notified one week prior to the pre-construction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.

ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.

ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.

ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.

ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.

ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.

ES-8: During dewatering operations, water will be pumped into an approved filtering device.

ES-9: The contractor shall inspect all erosion control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

9VAC25-840-40 : Minimum Standards

A VESCP must be consistent with the following criteria, techniques and methods:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

2. During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.

3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.

a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.

b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.

7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.

14. All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.

15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

a. No more than 500 linear feet of trench may be opened at one time.

b. Excavated material shall be placed on the uphill side of trenches.

c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.

d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.

e. Restabilization shall be accomplished in accordance with this chapter.

f. Applicable safety requirements shall be complied with.

17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.

18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:

a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.

b. Adequacy of all channels and pipes shall be verified in the following manner:

(1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or

(2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.

(b) All previously constructed man-made channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and

(c) Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.

c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:

(1) Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks; or

(2) Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances;

(3) Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase when runoff outfalls into a man-made channel; or

(4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.

d. The applicant shall provide evidence of permission to make the improvements.

e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.

f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.

g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.

h. All on-site channels must be verified to be adequate.

i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.

j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.

k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.

l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels

shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15:54 or 62.1-44.15:65 of the Act.

m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities are in accordance with 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMP) Regulation or are exempt pursuant to subdivision C 7 of § 62.1-44.15:34 of the Act.

n. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulation shall be deemed to satisfy the requirements of this subdivision 19.

APPENDIX 5 – EROSION AND SEDIMENT CONTROL STRUCTURES

Specifications- SILTSACK®

Purpose: A siltsack is a temporary catch basin filter that removes sediments, trash, and debris from entering a catch basin.

1.0 Description

1.1 This work shall consist of furnishing, installing, main- taining, and removing Siltsack sediment control device as directed by the engineer or as shown on the site drawings.

2.0 Materials

2.1 Siltsack®

2.1.1 Siltsack shall be manufactured from a specially designed woven polypropylene geotextile and sewn by a double needle machine, using a high strength nylon thread.

2.1.2 Siltsack will be manufactured to fit the opening of the catch basin or drop inlet. Siltsack will have the follow- ing features: two dump straps attached at the bottom to facilitate the emptying of Siltsack; Siltsack shallhave lifting loops as an integral part of the system to be used to lift Siltsack from the basin; Siltsack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indi cating when the sack should be emptied. Once the cord is covered with sediment, Siltsack should be emptied, cleaned and placed back into the basin.

Siltsack Regular Flow

Property	Test Method	Units	Typical Roll Value Test Results
Grab Tensile	ASTM D-4632	lbs.	167.5x300
Grab Elongation	ASTM D-4632	%	10x15
Puncture Strength	ASTM D-4533	lbs.	900
Trapezoid Tear	ASTM D-4533	lbs.	65x90
UV Resistance (@500 hrs)	ASTM D-4355	%	96
AOS	ASTM D-4751	US Sieve	30
Flow Rate	ASTM D-4491	gal/min/ft^2	66
Permittivity	ASTM D-4491	sec $^{-1}$	0.862

SILTSACK® High Flow

Value Property	Test Method	Units	Typical Roll Test Results
Grab Tensile	ASTM D-4632	lbs.	212x164
Grab Elongation	ASTM D-4632	%	31x19
Puncture Strength	ASTM D-4833	lbs.	86

SILTSACK® High Flow (cont.)

Property	Test Method	Units	Test Results
Trapezoid Tear	ASTM D-4533	lbs.	90x71
UV Resistance	ASTM D-4355	%	99.4
AOS	ASTM D-4751	US Sieve	20
Flow Rate	ASTM D-4491	gal/min/ft^2	100.6
Permittivity	ASTM D-4491	sec $^{-1}$	4.81

3.0 Construction Sequence

3.1 General

3.1.1 To install Siltsack in the catch basin, remove the grate and place the sack in the opening. Hold approximately six inches of the sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

3.1.2 When the restraint cord is no longer visible, Siltsack is full and should be emptied.

3.1.3 To remove Siltsack, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack to facilitate the lifting of Siltsack.

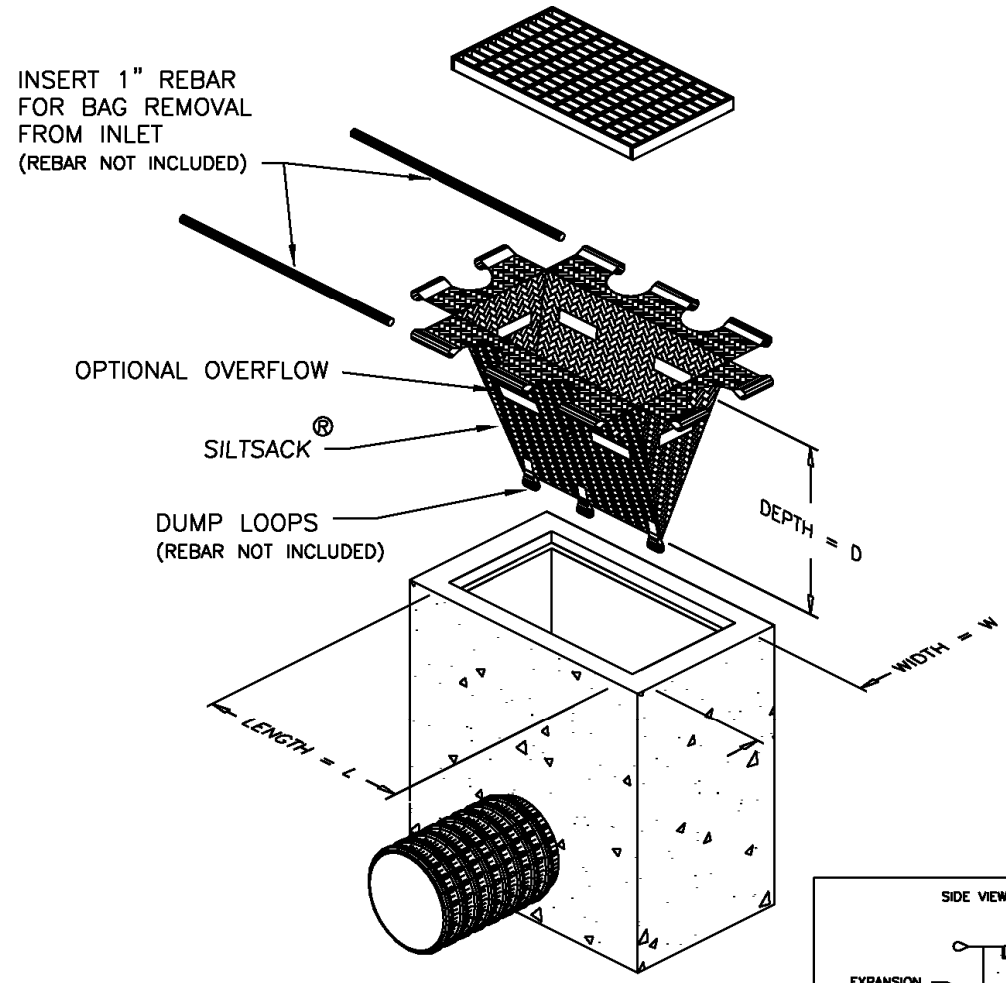
3.1.4 To empty Siltsack, place unit where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will lift Siltsack from the bottom and empty the contents. Clean out and rinse. Return Siltsack to its original shape and place back in the basin.

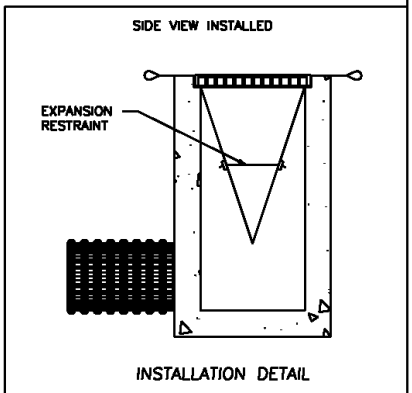
3.1.5 Siltsack is reusable. Once the construction cycle is complete, remove Siltsack from the basin and clean. Siltsack should be stored out of sunlight until next use.

4.0 Basis of Payment

4.1 Payment for all Siltsacks used during construction is to be included in the bid price for the overall erosion and sediment control plan unless unit price is requested. Maintenance of Siltsack also to be included in this price.

*Siltsack is covered by U.S. Patent No. 5,575,925.





DETAIL OF INLET SEDIMENT CONTROL DEVICE
TYPE A – WITHOUT CURB DEFLECTOR

Environmental
Your Complete Source for
Geosynthetic Solutions

ACF Environmental, Inc.
2831 Cardwell Rd.
Richmond, Virginia 23234
(800) 448-3636

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK ® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®

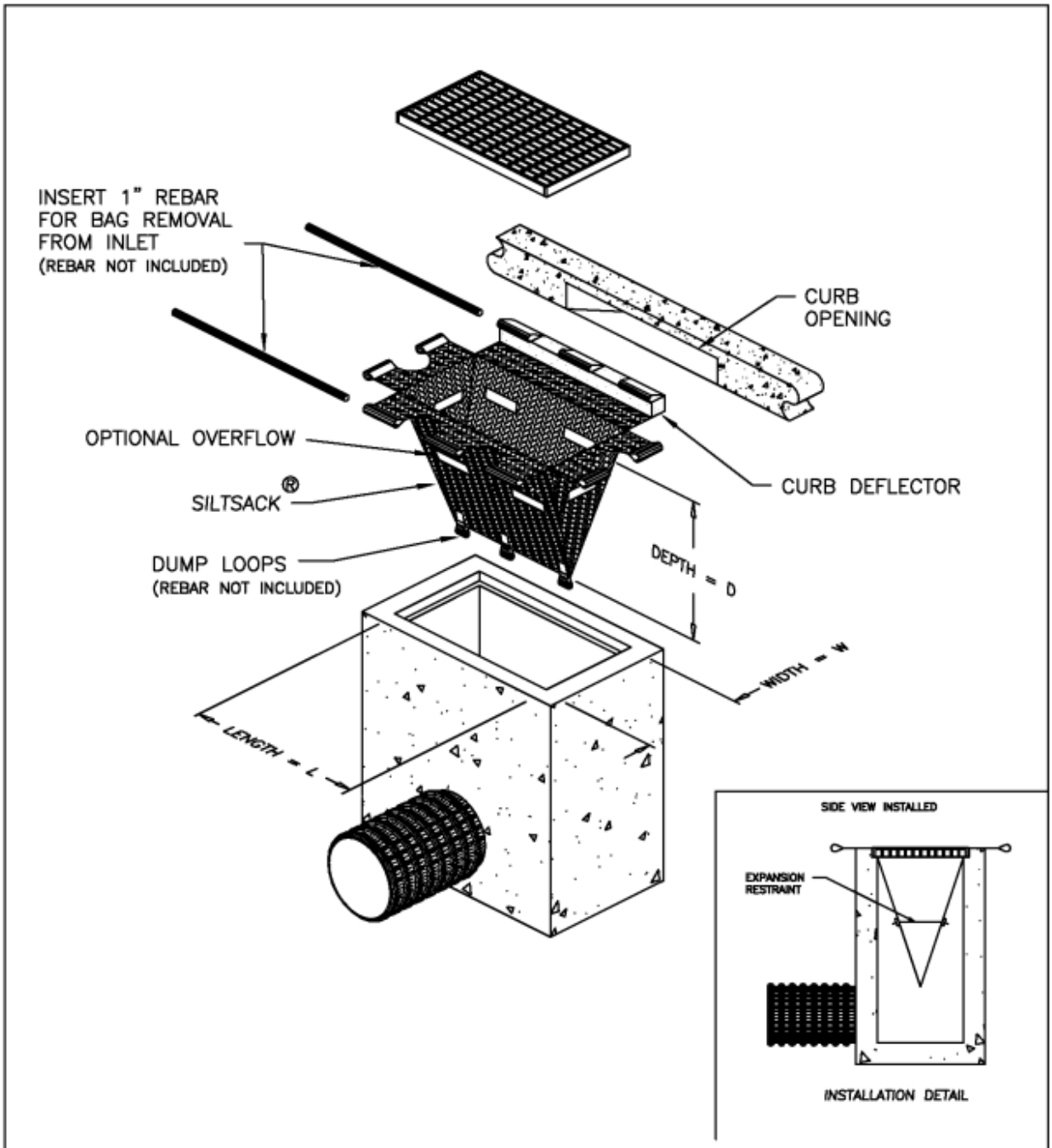
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK ,WITH A WOVEN PILLOW INSERT.



DETAIL OF INLET SEDIMENT CONTROL DEVICE
TYPE B – WITH CURB DEFLECTOR

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Your Complete Source for
Geosynthetic Solutions

ACF Environmental, Inc.
2831 Cardwell Rd.
Richmond, Virginia 23234
(800) 448-3636

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK ® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®

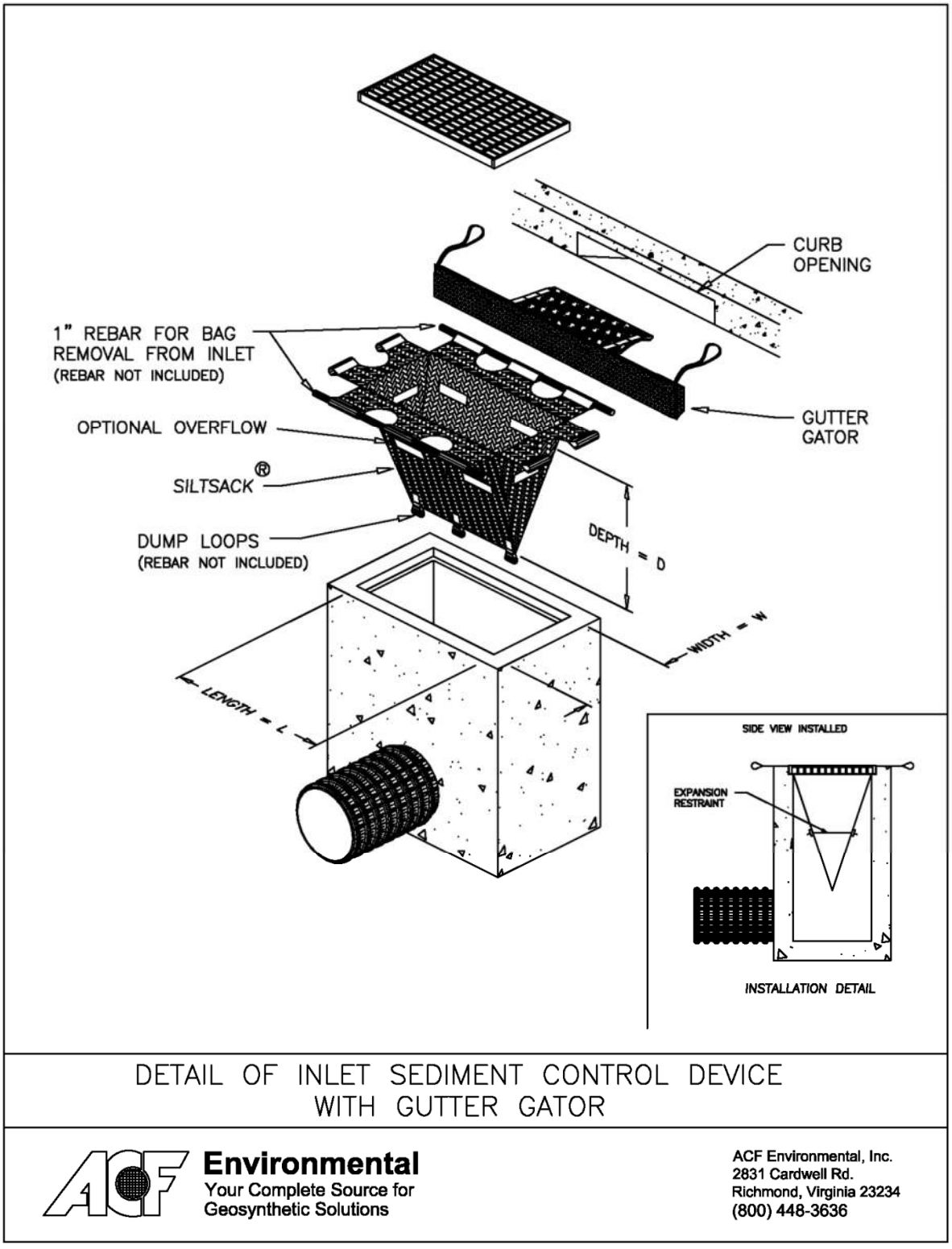
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK ®WITH A WOVEN PILLOW INSERT.



DETAIL OF INLET SEDIMENT CONTROL DEVICE
WITH GUTTER GATOR

Environmental
Your Complete Source for
Geosynthetic Solutions

ACF Environmental, Inc.
2831 Cardwell Rd.
Richmond, Virginia 23234
(800) 448-3636

SILTSACK® GUTTER GATOR® COMBINATION
SPECIFICATIONS

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
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FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK,® WITH A WOVEN PILLOW INSERT.

GUTTERBUDDY® Specification For Curb Gutter Storm Drains or equal substitute

1.0 Description

1.1 This work shall consist of furnishing, placing, maintaining and removing the Gutterbuddy® sediment control device as directed by the engineer and as shown on the contract drawings. The Gutterbuddy® sediment control system distributed nationally by:

ACF Environmental, Inc.
2831 Cardwell Drive
Richmond, Virginia 23234
Phone: 800-448-3636 Fax: 804-743-7779
www.acfenvironmental.com

2.0 Materials

2.1 GUTTERBUDDY®

The Gutterbuddy® shall be a synthetic filter manufactured from recycled synthetic fibers.

2.1.1 The Gutterbuddy® will be manufactured to be 9" in diameter and are available in 4', 6', 8', 10',12', 14' and 16' lengths and are to be sized a minimum of twenty four (24) inches longer than the curb inlet opening. This will allow for sufficient length to cover the inlet with twelve (12) inches beyond the inlet on both ends.

3.0 Construction Sequence

3.1 General

3.1.1 Install the Gutterbuddy® in front of the curb inlet opening. Each end of the Gutterbuddy® should overlap the curb inlet approximately 12".

3.1.2 When installed, the overflow bypass holes drilled through the Gutterbuddy® should be oriented to be parallel with the surface of the pavement. This will minimize ponding.

3.1.3 The Gutterbuddy® should be cleaned if a visual inspection shows silt and debris buildup around the Gutterbuddy®.

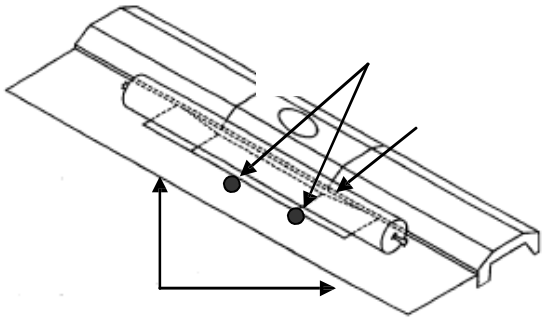
3.1.4 To remove the Gutterbuddy®, lift out of the opening.

3.1.5 The Gutterbuddy® is reusable. Once the construction project is complete and it is no longer needed for sediment control, remove, clean and store out of the sunlight until needed on the next project.

3.1.6 Ponding is likely if sediment is not removed regularly, or if the overflow bypass holes are not oriented properly. Inspection of Gutterbuddy® should be on a regular basis and immediately after major rain events.

4.0 Basis of Payment

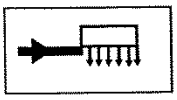
4.1 The payment for any Gutterbuddy® used during the construction is to be included in the bid of the overall erosion and sediment control plan and priced by the linear foot, or per unit based on length.



Available in Texas from:

EcoSupplies
6719 Theall Rd., Suite C
Houston, TX 77066
281-537-8657 Voice
281-537-1146 Fax
www.ecosupplies.com

STD & SPEC 3.21



LEVEL SPREADER

LS

Definition

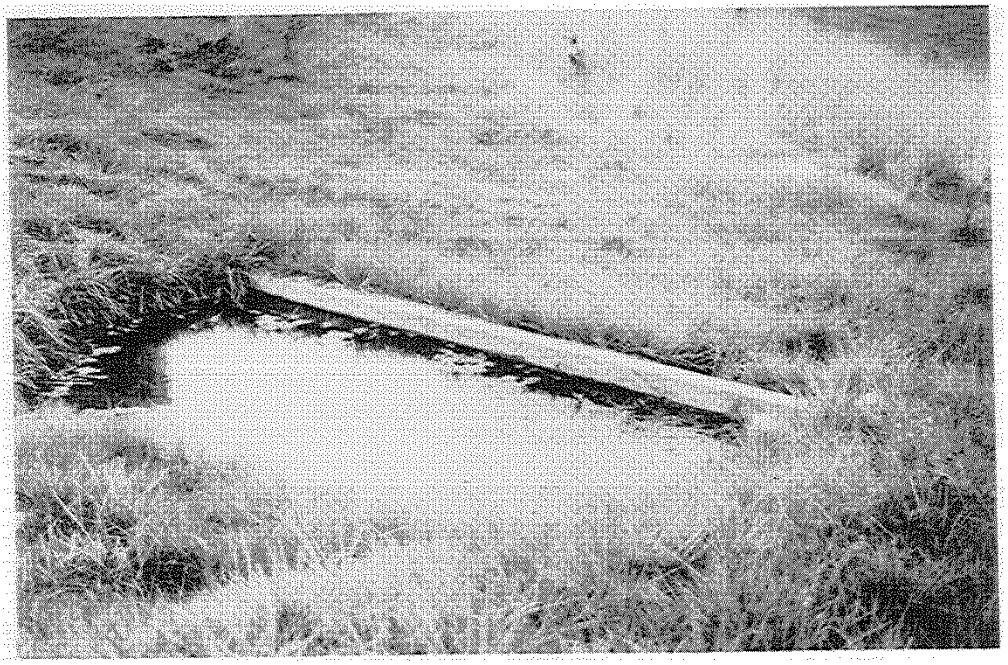
An outlet for dikes and diversions consisting of an excavated depression constructed at zero grade across a slope.

Purpose

To convert concentrated runoff to sheet flow and release it uniformly onto areas stabilized by existing vegetation.

Conditions Where Practice Applies

Where there is a need to divert stormwater away from disturbed areas to avoid overstressing erosion control measures; where sediment-free storm runoff can be released in sheet flow down a stabilized slope without causing erosion.



This practice applies only in those situations where the spreader can be constructed on undisturbed soil and the area below the level lip is uniform with a slope of 10% or less and is stabilized by natural vegetation. The runoff water should not be allowed to reconcentrate after release unless it occurs during interception by another measure (such as a permanent pond or detention basin) located below the level spreader.

Planning Considerations

The TEMPORARY DIVERSION DIKE, (Std.& Spec. 3.09) and the TEMPORARY RIGHT-OF-WAY DIVERSION, (Std. & Spec. 3.11) each call for a stable outlet for concentrated stormwater flows. The level spreader is a relatively low-cost structure to release small volumes of concentrated flow where site conditions are suitable (see Plate 3.21-1).

The outlet area must be uniform and well-vegetated with slopes 10% or less. Particular care must be taken to construct the outlet lip completely level in a stable, undisturbed soil. Any depressions in the lip will concentrate the flow, resulting in erosion. Under higher design flow conditions, a rigid outlet lip design should be used to create the desired sheet flow conditions. Runoff water containing high sediment loads must be treated in a sediment trapping device before being released to a level spreader.

Design Criteria

No formal design is required. The following criteria must be met:

Spreader Dimensions

Determine the capacity of the spreader by estimating the peak flow expected from a 10-year storm (Q_{10}).

Select the appropriate length, width and depth of the spreader from Table 3.21-A.

For design flows greater than 20 cfs, the measure should be designed by a qualified engineer.

A 20-foot transition section should be formed in the diversion channel so that the width of the diversion will smoothly tie in with the width of the spreader to ensure more uniform outflow.

The depth of the level spreader, as measured from the lip, shall be at least 6 inches. The depth may be made greater to increase temporary storage capacity, improve trapping of debris and to enhance settling of any suspended solids.

TABLE 3.21-A

MINIMUM DIMENSIONS FOR LEVEL SPREADER

Design Flow, Q_{10} (cfs)	Depth (ft.)	Width of Lower Side Slope of Spreader (ft.)	Length (ft.)
0-10	0.5	6	10
10-20	0.6	6	20

Source: Va. DSWC

Grade

1. The grade of the channel for the last 20 feet of the dike or diversion entering the level spreader shall be less than or equal to 1% (see Plate 3.21-1).

2. The grade of the level spreader channel shall be 0%.

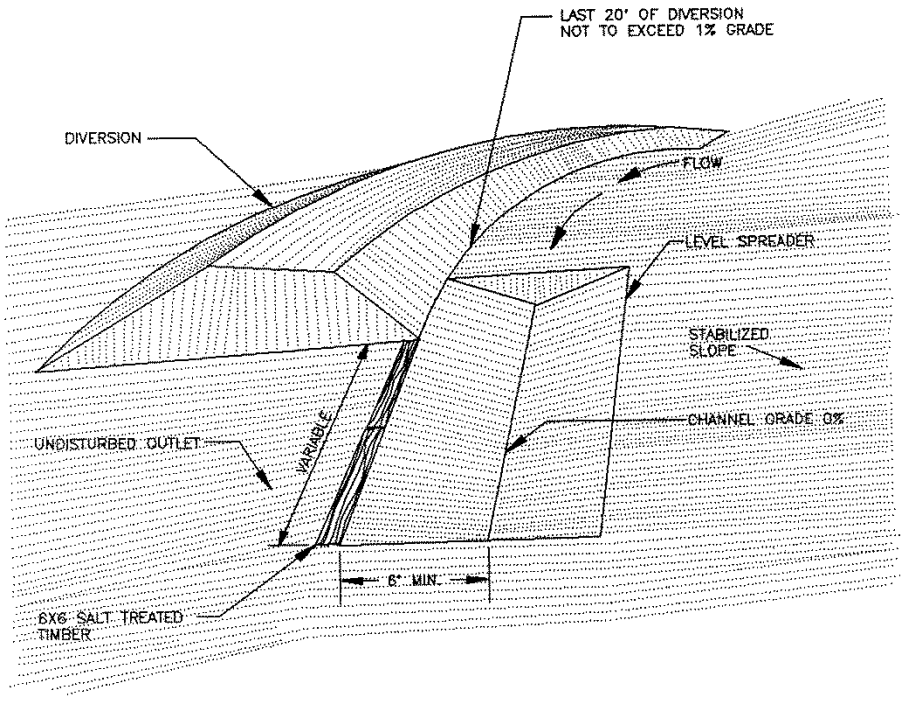
Spreader Lip

The release of the stormwater will be over the level lip onto an undisturbed well-vegetated area with a maximum slope of 10%. The level lip should be of uniform height and zero grade over the length of the spreader.

The level spreader lip may be stabilized by vegetation or may be of a rigid non-erodible material depending on the expected design flow:

Spreader Lip	Design Flow (cfs)
Vegetated	0 - 4
Rigid	5 - 20

LEVEL SPREADER



PERSPECTIVE VIEW

NOTE: ALL TEMPORARY BERMS, SWALES AND LEVEL SPREADER DITCH MUST RECEIVE TEMPORARY SEEDING IMMEDIATELY AFTER INSTALLATION

Source: Adapted from N.C. Erosion and Sediment Control Planning and Design Manual

Plate 3.21-1

A vegetated level lip must be constructed with an erosion-resistant material, such as jute or excelsior blankets, to inhibit erosion and allow vegetation to become established (see Plate 3.21-2).

For higher design flows and permanent installations, a rigid lip of non-erodible material, such as pressure-treated timbers or concrete curbing, should be used (see Plate 3.21-2).

Construction Specifications

1. Level spreaders must be constructed on undisturbed soil (not fill material).

2. The entrance to the spreader must be shaped in such a manner as to insure that runoff enters directly onto the 0% channel.

3. Construct a 20-ft. transition section from the diversion channel to blend smoothly to the width and depth of the spreader.

4. The level lip shall be constructed at 0% grade to insure uniform spreading of stormwater runoff.

5. Protective covering for vegetated lip should be a minimum of 4 feet wide extending 6 inches over the lip and buried 6 inches deep in a vertical trench on the lower edge. The upper edge should butt against smoothly cut sod and be securely held in place with closely spaced heavy duty wire staples (see Plate 3.21-2).

6. Rigid level lip should be entrenched at least 2 inches below existing ground and securely anchored to prevent displacement. An apron of VDOT #1, #2 or #3 Coarse Aggregate should be placed to top of level lip and extended downslope at least 3 feet. Place filter fabric under stone and use galvanized wire mesh to hold stone securely in place (see Plate 3.21-2).

7. The released runoff must outlet onto undisturbed stabilized areas with slope not exceeding 10%. Slope must be sufficiently smooth to preserve sheet flow and prevent flow from concentrating.

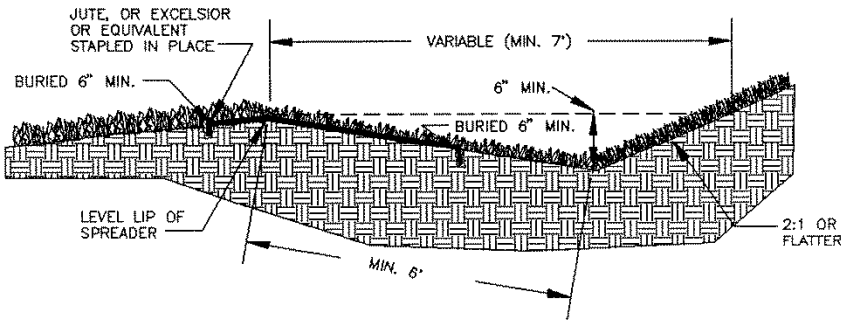
8. Immediately after its construction, appropriately seed and mulch the entire disturbed area of the spreader.

Maintenance

The measure shall be inspected after every rainfall and repairs made, if required. Level spreader lip must remain at 0% slope to allow proper function of measure. The contractor should avoid the placement of any material on and prevent construction traffic across the structure. If the measure is damaged by construction traffic, it shall be repaired immediately.

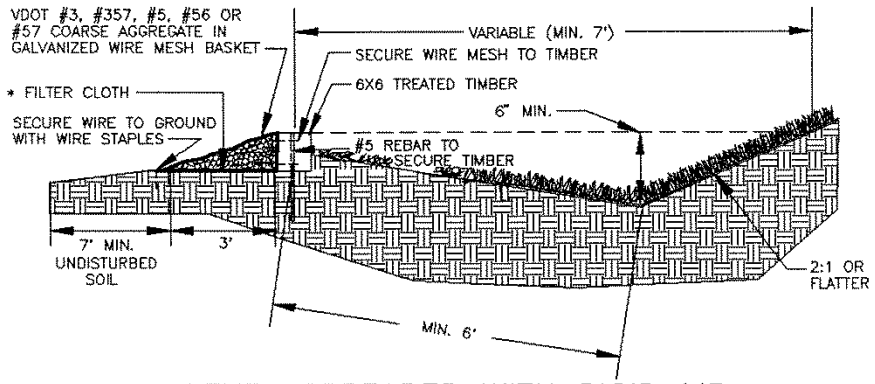
LEVEL SPREADER

CROSS SECTION



LEVEL SPREADER WITH VEGETATED LIP

CROSS SECTION



LEVEL SPREADER WITH RIGID LIP

* MIN. PHYSICAL REQUIREMENTS OF FILTER CLOTH NOTED IN STD. & SPEC. 3.19, RIPRAP

Source: Va. DSWC and N.C. Erosion and Sediment Control Planning and Design Manual

Plate 3.21-2

C-9 STANDARDS AND SPECIFICATIONS

FOR

DIVERSION FENCE

Definition

A temporary barrier of impermeable sheeting over chain link fence located in such a manner as to direct water to a desired location.

Purpose

To direct sediment-laden runoff to a sediment trapping practice, or to intercept and divert clear water away from disturbed areas.

Conditions Where Practice Applies

Constructed along the limit of disturbance (LOD) or across disturbed areas, a diversion fence is used when there is insufficient space to construct an earth dike, temporary swale, or perimeter dike swale.

Appropriate uses of diversion fences include the following:

1. To divert sediment-laden runoff from a disturbed area to a sediment trapping practice.
2. To segment drainage areas for reducing acreage to sediment control practices.
3. To divert clear water from an undisturbed area to a stable outlet at non-erosive velocities.

Design Criteria

1. The maximum slope along fence is 10 percent.
2. The maximum drainage area is 2 acres.
3. For drainage areas larger than 2 acres, an engineering design may be used based on the 2-year frequency storm with NRCS methodologies (i.e., TR-55, TR-20), assuming the worst soil cover conditions to prevail in the contributing drainage area over the life of the diversion fence.
4. Maintain positive drainage along the entire length of the diversion fence. Spot elevations must be provided for diversion fence having longitudinal slopes flatter than 1%.
5. Discharge velocities from diversion fence must be non-erosive.
6. Where diversion fence is used to convey runoff from disturbed areas, the discharge must be to a sediment control practice suitable for concentrated flow. Silt fence and super silt fence are unacceptable for receiving discharges from diversion fence.
7. Where diversion fence is used to convey clear water runoff, the discharge must be to an undisturbed, stable area at a non-erosive velocity (4 fps); otherwise, provide outlet protection.

8. When diversion fence is used in conjunction with a sediment trapping device, sequence construction so that the diversion fence installation follows completion of the sediment trapping device(s).

Maintenance

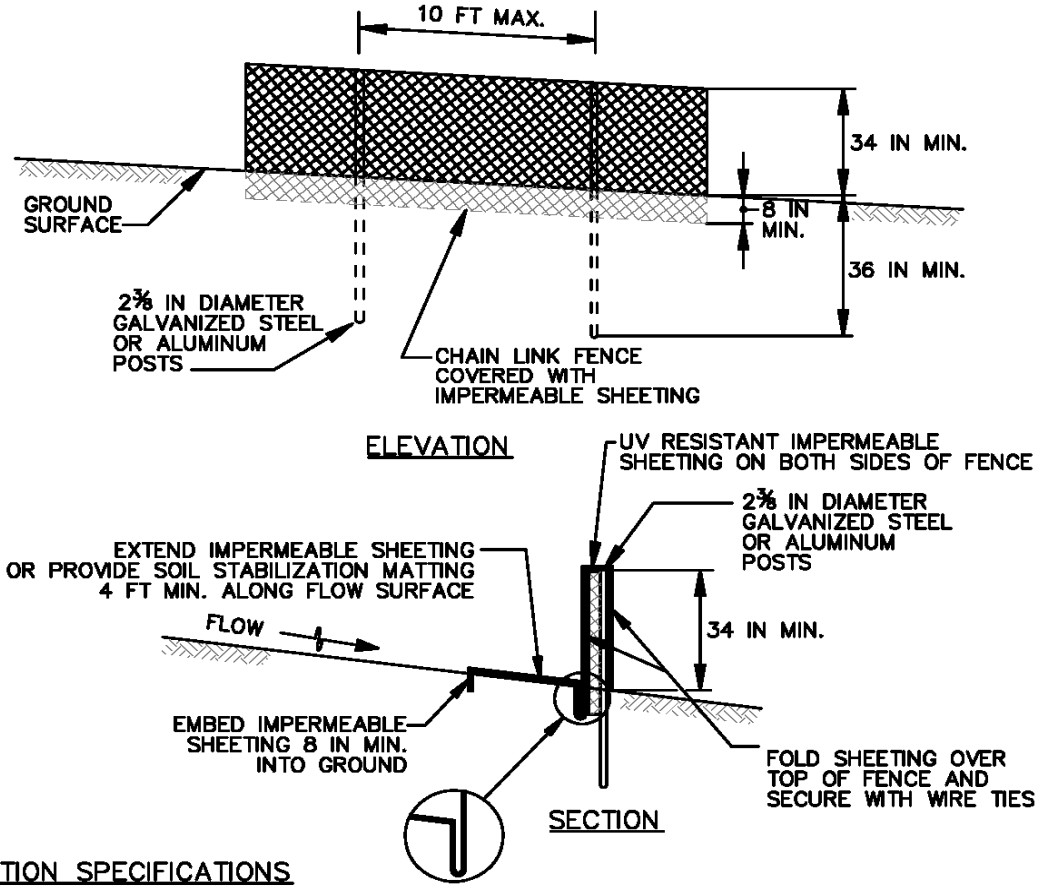
The flow surface along the diversion fence and at the point of discharge must be kept free of erosion. Accumulated sediment and debris must be removed and positive drainage maintained. Impermeable sheeting must be replaced if torn. If undermining occurs, reinstall fence.

DETAIL C-9 DIVERSION FENCE

STANDARD SYMBOL

DF

MAXIMUM DRAINAGE AREA = 2 ACRES



CONSTRUCTION SPECIFICATIONS

1. USE 42 INCH HIGH, 9 GAUGE OR THICKER CHAIN LINK FENCING (2⅜ INCH MAXIMUM OPENING).
2. USE 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. THE POSTS DO NOT NEED TO BE SET IN CONCRETE.
3. FASTEN CHAIN LINK FENCE SECURELY TO THE FENCE POSTS WITH WIRE TIES.
4. SECURE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING TO CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT TOP, MID SECTION, AND BELOW GROUND SURFACE.
5. EXTEND SHEETING A MINIMUM OF 4 FEET ALONG FLOW SURFACE AND EMBED END A MINIMUM OF 8 INCHES INTO GROUND. SOIL STABILIZATION MATTING MAY BE USED IN LIEU OF IMPERMEABLE SHEETING ALONG FLOW SURFACE.
6. WHEN TWO SECTIONS OF SHEETING ADJOIN EACH OTHER, OVERLAP BY 6 INCHES AND FOLD WITH SEAM FACING DOWNGRADE.
7. KEEP FLOW SURFACE ALONG DIVERSION FENCE AND POINT OF DISCHARGE FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE. REPLACE IMPERMEABLE SHEETING IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

E-2 STANDARDS AND SPECIFICATIONS

FOR

SILT FENCE ON PAVEMENT

Definition

A temporary barrier of woven geotextile used to intercept, retain, and filter surface runoff from disturbed areas.

Purpose

To intercept sediment-laden sheet flow runoff allowing the deposition of sediment transported from upslope. Silt fence is not to be used where it will intercept concentrated flow.

Conditions Where Practice Applies

Silt fence on pavement is limited to intercepting sheet flow runoff from small disturbed areas when standard silt fence cannot be used. The use of silt fence on pavement is based on the slope length and steepness of the contributing drainage area.

Design Criteria

Table E.2: Silt Fence on Pavement Design Constraints

Average Slope Steepness	Maximum Slope Length	Maximum Silt Fence Length
Flatter than 50:1 (<2%)	250 feet	500 feet
50:1 to 10:1 (2-10%)	125 feet	250 feet
<10:1 to 5:1 (>10-20%)	100 feet	200 feet

1. Silt fence on pavement must be placed on the contour.

2. The use of silt fence on pavement must conform to the design constraints listed in Table E.2 above.

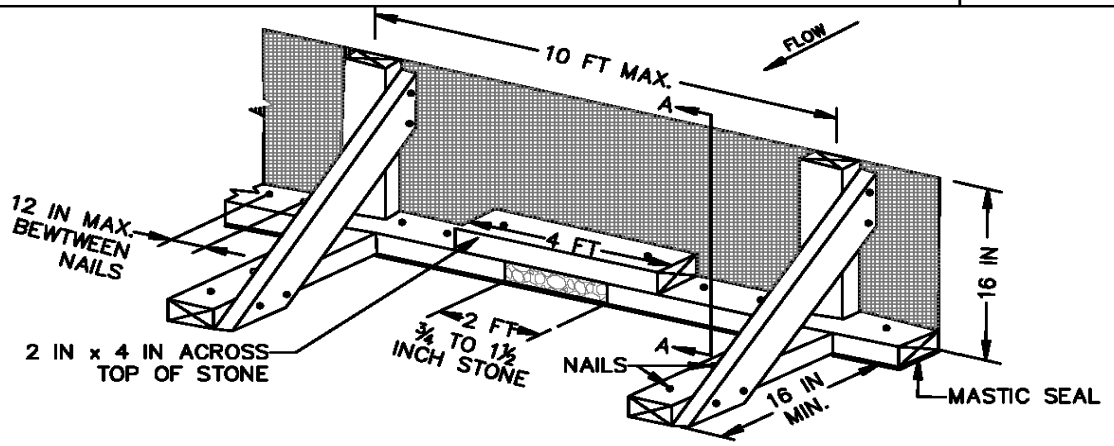
Maintenance

Accumulated sediment and debris must be removed when bulges develop in the silt fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torn. The water tight seal along the bottom must be maintained and the stone replaced if displaced.

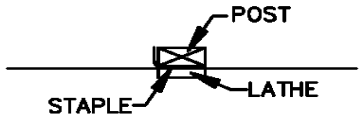
DETAIL E-2 SILT FENCE ON PAVEMENT

STANDARD SYMBOL

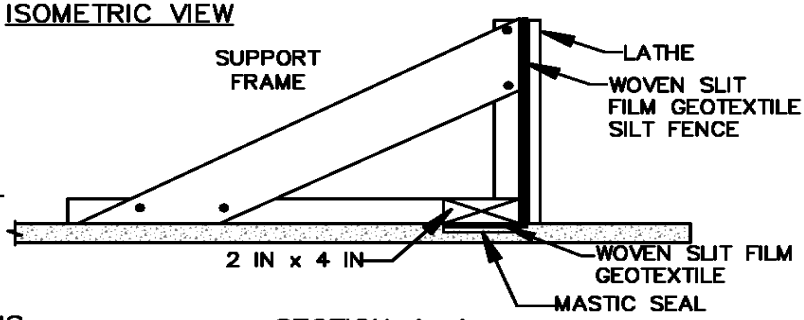
SFOP



ISOMETRIC VIEW



JOINING ADJACENT SECTIONS OF GEOTEXTILE



SECTION A–A

CONSTRUCTION SPECIFICATIONS

1. USE NOMINAL 2 INCH X 4 INCH LUMBER.
2. USE WOVEN SLIT FILM GEOTEXTILE, AS SPECIFIED IN SECTION H–1 MATERIALS.
3. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H–1 MATERIALS.
4. SPACE UPRIGHT SUPPORTS NO MORE THAN 10 FEET APART.
5. PROVIDE A TWO FOOT OPENING BETWEEN EVERY SET OF SUPPORTS AND PLACE STONE IN THE OPENING OVER GEOTEXTILE.
6. KEEP SILT FENCE TAUT AND SECURELY STAPLE TO THE UPSLOPE SIDE OF UPRIGHT SUPPORTS. EXTEND GEOTEXTILE UNDER 2x4.
7. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, FOLD, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL. ATTACH LATHE.
8. PROVIDE A MASTIC SEAL BETWEEN PAVEMENT, GEOTEXTILE, AND 2x4 TO PREVENT SEDIMENT–LADEN WATER FROM ESCAPING BENEATH SILT FENCE INSTALLATION.
9. SECURE BOARDS TO PAVEMENT WITH 40D 5 INCH MINIMUM LENGTH NAILS.
10. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. MAINTAIN WATER TIGHT SEAL ALONG BOTTOM. REPLACE STONE IF DISPLACED.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

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H-6 STANDARDS AND SPECIFICATIONS

FOR

ONSITE CONCRETE WASHOUT STRUCTURE

Definition

A prefabricated or fabricated container used for containing wash water from rinsing out concrete trucks, drums, pumps, chutes, other equipment, and concrete truck exteriors.

Purpose

To promote proper disposal of waste concrete and wash water by containing it onsite thereby preventing contamination of waterways, groundwater, and storm drains.

Conditions Where Practice Applies

Concrete washout structures are used when concrete equipment is cleaned onsite.

Design Criteria

1. Concrete washout structures must be located a minimum of 50 feet away from open channels, storm drain inlets, sensitive areas, wetlands, buffers, and waterways.

2. The location of the washout structure must be away from construction traffic.

3. Excavated washout structures must be located so that they do not intercept surface runoff. If runoff drains toward an excavated structure, a diversion must be provided around the structure.

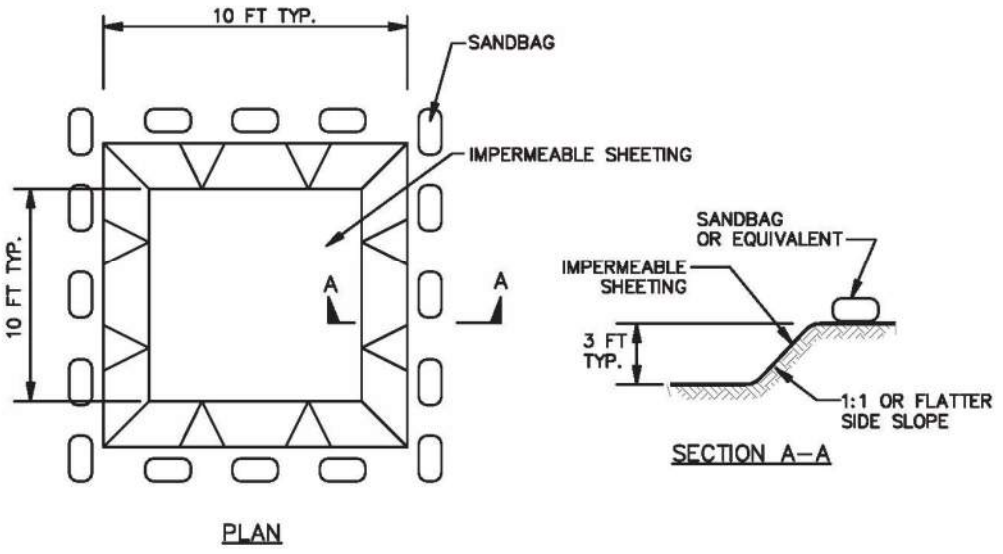
4. Prefabricated containers are an acceptable alternative to fabricated washout structures provided the volume is adequate to contain all wash water and solids while maintaining at least 4 inches of freeboard.

Maintenance

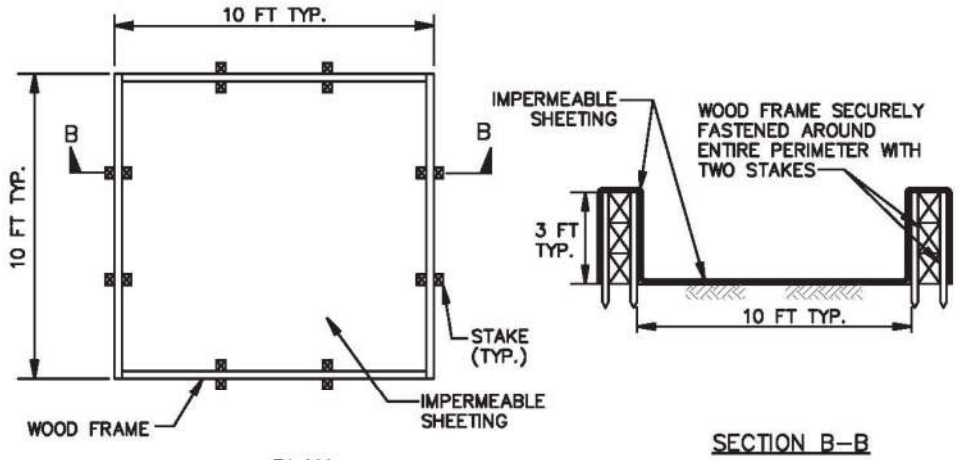
It is critical that the concrete washout structure be watertight. The impermeable liner needs to be replaced if damaged (e.g., ripped or punctured). A washout structure that is 75 percent full must be emptied or replaced, and the accumulated material must be disposed of properly. The liner may not be reused. Prefabricated containers require less maintenance. Stored liquids that have not evaporated can be wet vacuumed and disposed of in an approved manner. Prior to forecasted rainstorms, remove liquids or cover the structure to prevent overflows. Hardened solids can be removed whole or broken up for disposal or recycling. Runoff diversion(s) around an excavated washout structure must be maintained until the structure is removed.

DETAIL H-6 ONSITE CONCRETE WASHOUT STRUCTURE

STANDARD SYMBOL: CWS



EXCAVATED WASHOUT STRUCTURE



WASHOUT STRUCTURE WITH WOOD PLANKS

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
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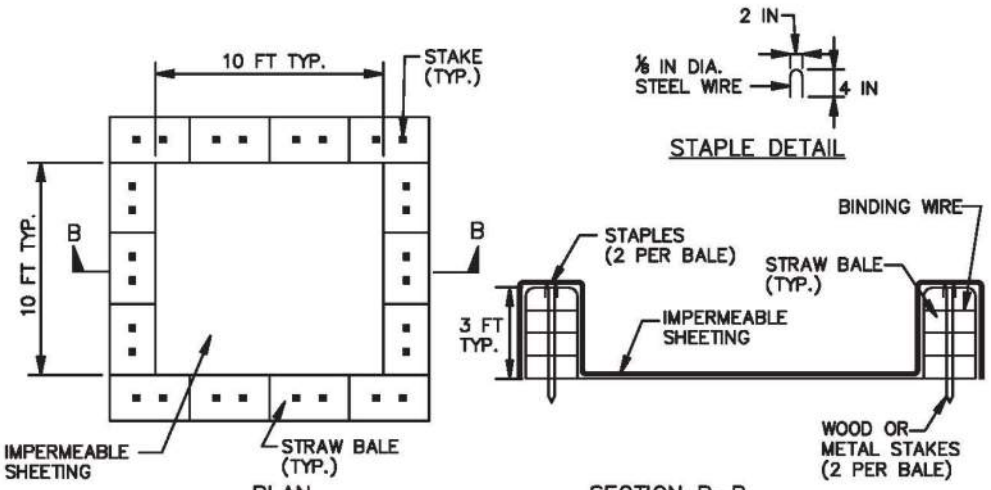
H.24

DETAIL H-6 ONSITE CONCRETE WASHOUT STRUCTURE

STANDARD SYMBOL: CWS



NOTE: CAN BE TWO STACKED BALES OR PARTIALLY EXCAVATED TO REACH 3 FT DEPTH

WASHOUT STRUCTURE WITH STRAW BALES

CONSTRUCTION SPECIFICATIONS

1. LOCATE WASHOUT STRUCTURE A MINIMUM OF 50 FEET AWAY FROM OPEN CHANNELS, STORM DRAIN INLETS, SENSITIVE AREAS, WETLANDS, BUFFERS AND WATER COURSES AND AWAY FROM CONSTRUCTION TRAFFIC.
2. SIZE WASHOUT STRUCTURE FOR VOLUME NECESSARY TO CONTAIN WASH WATER AND SOLIDS AND MAINTAIN AT LEAST 4 INCHES OF FREEBOARD. TYPICAL DIMENSIONS ARE 10 FEET X 10 FEET X 3 FEET DEEP.
3. PREPARE SOIL BASE FREE OF ROCKS OR OTHER DEBRIS THAT MAY CAUSE TEARS OR HOLES IN THE LINER. FOR LINER, USE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING, FREE OF HOLES AND TEARS OR OTHER DEFECTS THAT COMPROMISE IMPERMEABILITY OF THE MATERIAL.
4. PROVIDE A SIGN FOR THE WASHOUT IN CLOSE PROXIMITY TO THE FACILITY.
5. KEEP CONCRETE WASHOUT STRUCTURE WATER TIGHT. REPLACE IMPERMEABLE LINER IF DAMAGED (E.G., RIPPED OR PUNCTURED). EMPTY OR REPLACE WASHOUT STRUCTURE THAT IS 75 PERCENT FULL, AND DISPOSE OF ACCUMULATED MATERIAL PROPERLY. DO NOT REUSE PLASTIC LINER. WET–VACUUM STORED LIQUIDS THAT HAVE NOT EVAPORATED AND DISPOSE OF IN AN APPROVED MANNER. PRIOR TO FORECASTED RAINSTORMS, REMOVE LIQUIDS OR COVER STRUCTURE TO PREVENT OVERFLOWS. REMOVE HARDENED SOLIDS, WHOLE OR BROKEN UP, FOR DISPOSAL OR RECYCLING. MAINTAIN RUNOFF DIVERSION AROUND EXCAVATED WASHOUT STRUCTURE UNTIL STRUCTURE IS REMOVED.

2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

H.25

APPENDIX H.9

GUTTERGATOR® Specification For Curb Gutter Storm Drains or equal substitute

1.0 Description

1.1 This work shall consist of furnishing, placing, maintaining and removing the GutterGator sediment control device as directed by the engineer and as shown on the contract drawings. The GutterGator sediment control system manufactured by:

ACF Environmental, Inc.
2831 Cardwell Road
Richmond, Virginia 23234
Phone: 800-448-3636 ⌘ Fax: 804-743-7779
www.acfenvironmental.com

2.0 Materials

2.1 GUTTERGATOR

2.1.1 The GutterGator will be manufactured to 3' molds in 3', 6', 9', 12', 15' and 18' lengths and a minimum of twenty-four (24) inches longer than the curb inlet opening. This will allow for sufficient length to cover the inlet with twelve (12) inches beyond the inlet on both ends.

3.0 Construction Sequence

3.1 General

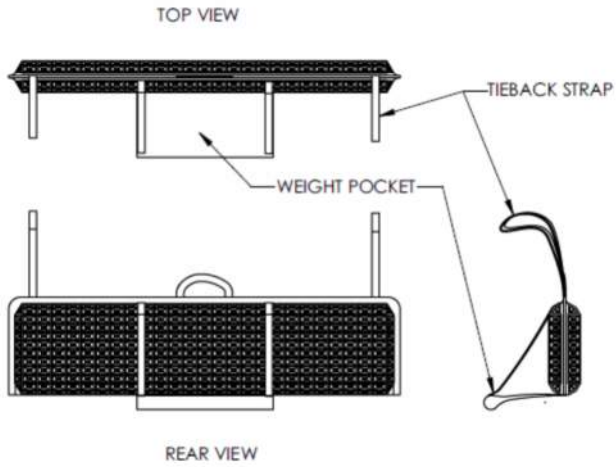
3.1.1 Install the GutterGator in front of the curb inlet opening. Drop 7lb weight sock into inlet opening, secure tie back straps, if applicable. Each end of the GutterGator should overlap the curb inlet approximately 12".

3.1.2 The GutterGator should be cleaned if a visual inspection shows sediment and debris build up around theGutterGator.

3.1.3 To remove the GutterGator, lift out of curb opening with provided carrying handle.

3.1.4 Clean as needed. Store out of direct sunlight.

3.1.5 Ponding is likely if sediment is not removed regularly. Inspection of GutterGator should be on a regular basis and immediately after wet Weather.



Available in Virginias from:
ACF Environmental
"Complete Source for Storm Water Solutions"

Distributed by:
2831 Cardwell Road Richmond, Virginia 23234 (800)
644-9223 (800) 448-3636 Voice
(804) 743-7779 Fax
•www.thebmpstore.com
www.acfenvironmental.com

TURF AND GRASSES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Virginia Erosion and Sediment Control Handbook (VESCH)

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding
3. Sodding

1.3 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizer to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing or pre-developed soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turf grass sod. Include identification of source and name and telephone number of supplier.

C. Qualification Data: For qualified landscape installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For all existing imported or manufactured topsoils.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscaper Installer whose work has resulted in successful turf establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
2. Maintenance Proximity: Not more than two hours normal travel time from Installer's place of business to Project site.

B. Soil-Testing Laboratory Qualifications: An independent laboratory recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: Furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt and clay content; caution exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from the geotechnical engineer. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lea, lithium, and vanadium. If such problem materials are present, provide additional recommendations or corrective action.

D. Soil Preparation (VESCH)

1. Prior to soil preparation, areas to be seeded, hydroseeded, and/or sodded shall be brought to final grade in accordance with the approved plan.

2. Soil tests will be executed to determine the exact requirements for lime and fertilizer. Soil tests may be conducted by an independent laboratory recognized by the State Department of Agriculture.

3. Under difficult circumstances where it is not possible to obtain a soil test, the following soil amendments shall be made:

a. Pulverized agricultural limestone at 90 lbs. /1000 sq. ft. (2 tons/acre).

b. Fertilizer at 10 lbs./1000 sq. ft. (450 lbs./acre) of 10-10-10 in fall or spring

4. Note: Equivalent nutrients may be applied with other fertilizer formulations.
   a. These amendments shall be spread evenly over the area to be seeded, hydroseeded, and/or sodded, and incorporated (if possible) into the top 3 to 6 inches of the soil by discing, harrowing or other acceptable means.

5. Any irregularities in the soil surface resulting from top-soiling or other operations shall be filled or leveled in order to prevent the formation of depressions or water pockets.

6. Areas to be topsoiled and topsoil used shall fulfill the requirements of TOPSOILING, Std. & Spec. 3.30. No sod shall be spread on soil which has been treated with soil sterilants or any other toxic herbicides until enough time has elapsed to permit dissipation of toxic materials.

E. Preinstallation Conference: Conduct conference at Project Site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion. Permanent seeding only during Spring – Fall, no seeding in winter, otherwise use sod.

1. Spring Planting: March I-March 14, or as approved by the Owner.
2. Fall Planting: August I5-November 15, or as approved by the Owner.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 90 days from date of planting completion.
2. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
3. Sodded Turf: 30 days from date of planting completion.
4. Plugged Turf: 30 days from date of planting completion.
5. Sprigged Turf: 30 days from date of planting completion.

PART 2 – PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species as follows: See Drawings.

C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than percent weed seed:

1. Full Sun Mixture: Proportioned by weight as follows:
   a. 50 percent Kentucky bluegrass.
   b. 20 percent perennial ryegrass.
   c. 15 percent chewings fescue.

d. 15 percent creeping red fescue.

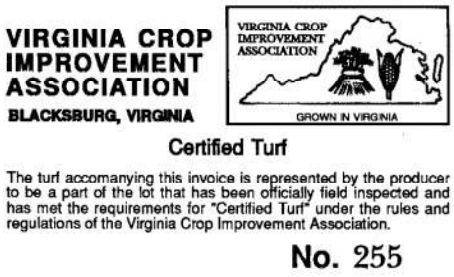
2. Shade Mixture: Proportioned by weight as follows:
   a. 30 percent chewing fescue.
   b. 15 percent creeping red fescue.
   c. 30 percent Kentucky bluegrass.
   d. 35 percent hard fescue.

D. Grass Seed Mix: Proprietary seed mix as follows:

1. Products: Subject to compliance with requirements and approval from Owner.

2.2 TURFGRASS SOD

A. Turfgrass Sod: Certified, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable so of uniform density, color and texture, strongly rooted, and capable of vigorous growth and development when planted. Sod used shall be state-certified. Certified turfgrass sod is grown from Certified seed, inspected and certified by the Virginia Crop Improvement Association (VCIA) or the certifying agency in other states. This ensures genetic purity, high quality, freedom from noxious weeds and excessive insect or disease problems. The sod must meet published state standards and bear an official blue "Certified Turf" label on the bill of lading.



B. Sod shall be machine cut at a uniform soil thickness of 3/4 inch (± 1/4 inch) at the time of cutting. This thickness shall exclude shoot growth and thatch.

C. Pieces of sod shall be cut to the supplier's standard width and length, with a maximum allowable deviation in any dimension of 5%. Torn or uneven pads will not be acceptable.

D. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp on one end of the section.

E. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. 50 percent Kentucky bluegrass.
2. 30 percent chewing fescue.
3. 20 percent perennial ryegrass.
4. 10 percent redtop

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No.8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
2. Class: 0, with a minimum of 95 percent passing through No.8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.
3. Provide lime in form of ground calcitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No.6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: H0l1icuiturai perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2. Feedstock: Agricultural, food, or industrial residuals; bio-solids; yard trimmings; or source separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 Ib/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 Ib/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.

E. Manure: Well-rotted, un leached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZERS

A. Fertilizers to be used on site shall abide by the approved Nutrient Management Plan for Smithsonian Institution.

2.6 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 6.0 to 7.0, a minimum of 6 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil in accordance with the VESCH to produce planting soil.

B. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

1. Supplement with accepted planting soil when quantities are insufficient.

2. Mix existing, native surface topsoil in accordance with the VESCH to produce planting soil.

C. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil in accordance with the VESCH to produce planting soil.

D. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 rnrn) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, airfilled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2. Mix imported topsoil or manufactured topsoil in accordance with the VESCH to produce planting soil.

E. Lightweight On-Structure Planting Soil: Mix produced by modifying planting soil as follows:

1. Planting Soil: One pali(s), except replace half of sand content with perlite.

2. Additional Perlite: One part.

3. Additional Sphagnum or Muck Peat: One part.

4. Additional Lime: Ground calcitic limestone applied at the rate of 3 lb per cu. yd. (1.36 kg per cu. m).

2.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew-and seed-free, salt hay or threshed straw of wheat or oats.

B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.8 PESTICIDES

A. Pesticides to be used on site shall abide by the approved Nutrient Management Plan for Smithsonian Institution.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Owner and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (l00 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply superphosphate fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface as specified, and thoroughly blend planting soil.

   a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

   b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 8 inches (200 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

   a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.

   b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Loosen surface soil to a depth of at least 4 inches (100 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.

   a. Apply superphosphate fertilizer directly to surface soil before loosening.

3. Remove stones larger than I inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.

4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Owner's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate per VESCH.

C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate per VESCH to form a continuous blanket 1-1/2 inches (38mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./l000 sq. ft. (38 to 49 L/92.9 sq. m). Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch or planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch (4.8 mm), and roll surface smooth.

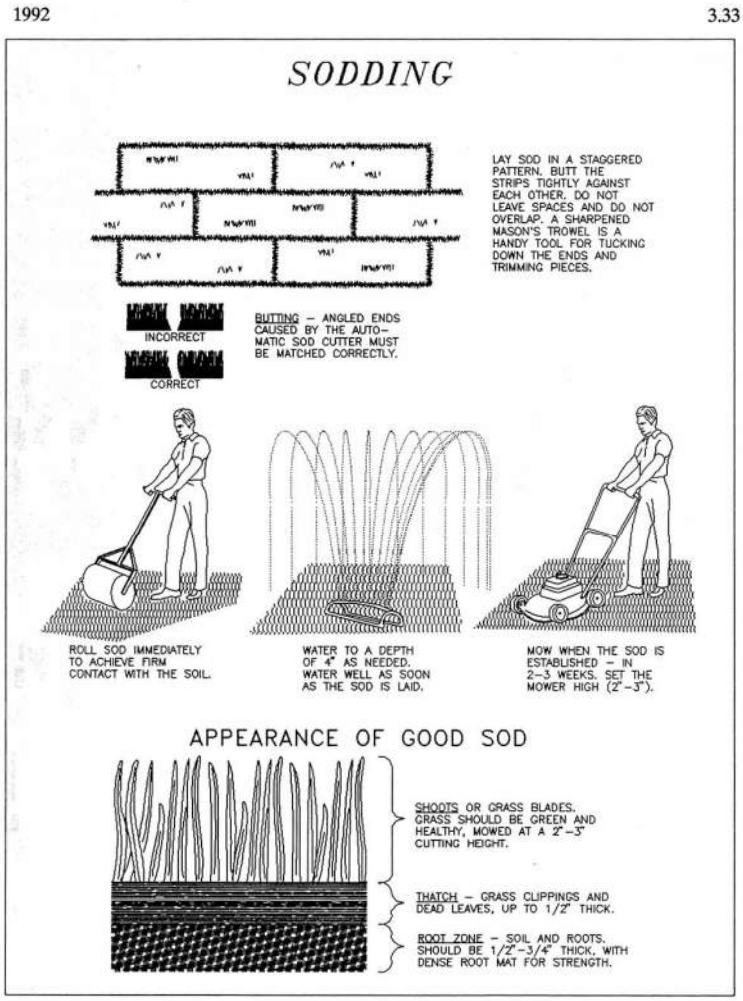
3.5 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseeded application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with nonasphaltic tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process.
3. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre (l5.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.6 SODDING

A. Lay sod within 24 hours of harvesting [unless a suitable preservation method is accepted by Owner prior to delivery time]. Do not lay sod if dormant or if ground is frozen or muddy. Sod shall be harvested,



delivered, and installed within a period of 36 hours.

B. Install thin cut sand-based sod directly over sand filled clovers, sand filled no higher than the top of the clovers.

C. Lay sod to form a solid mass with tightly fitted joints, moistened and rolled to create good contact for growth. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across slopes exceeding 1:3, sod shall be laid with staggered joints and secured by stapling or other approved methods. Sod shall be installed with the length perpendicular to the slope (on the contour).
2. Anchor sod on slopes exceeding 1:6 with wood pegs [or steel staples] spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.

D. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

E. Sodded areas must be fertilized and kept moist during root establishment (minimum of 3 weeks).

F. Sod should not be laid on soil surfaces that are frozen.

G. During periods of high temperature, the soil shall be lightly irrigated immediately prior to laying the sod, to cool the soil and reduce root burning and dieback.

H. As sodding of clearly defined areas is completed, sod shall be rolled or tamped to provide firm contact between roots and soil.

I. After rolling, sod shall be irrigated to a depth sufficient that the underside of the sod pad and the soil 4 inches below the sod is thoroughly wet.

J. Until such time a good root system becomes developed, in the absence of adequate rainfall, watering shall be performed as often as necessary to maintain moist soil to a depth of at least 4 inches.

The first mowing shall not be attempted until the sod is firmly rooted, usually 2-3 weeks. Not more than one third of the grass leaf shall be removed at any one cutting.

3.7 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm).

1. During the 2 to 3 week establishment stage, sod shall be watered as necessary to maintain adequate moisture in the root zone and prevent dormancy of sod.

2. No more than one third of the shoot (grass leaf) should be removed in any mowing. Grass height should be maintained between 2 and 3 inches unless otherwise specified.

3. After the first growing season, established sod will require fertilization and may require lime. Follow soil test recommendations when possible, or apply maintenance levels as outlined in Table 3.33-B.

4. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
5. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.
   a. Watering of turf shall be required for 1 month after installation.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow [bentgrass] to a height of 1/2 inch (13 mm) or less.
2. Mow [bermudagrass] to a height of 1/2 to 1 inch (13 to 25 mm).
3. Mow [carpetgrass] [centipedegrass] [perennial ryegrass] [zoysiagrass] to a height of 1 to 2 inches (25 to 50 mm).
4. Mow [Kentucky bluegrass] [buffalograss] [annual ryegrass] [chewings red fescue] to a height of 1-1/2 to 2 inches (38 to 50 mm).
5. Mow [bahiagrass] [turf-type tall fescue] [St. Augustinegrass] to a height of 2 to 3 inches (50 to 75 mm).

D. Turf Postfertilization: Apply [commercial fertilizer] [slow-release fertilizer] after initial mowing and when grass is dry.

3.8 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Owner:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding [90 percent over any 5 sq. ft. (0.46 sq. m) and bare spots not exceeding 3 by 3 inches (76 by 76 mm)].
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas. Cleanup and protection shall comply with minimum standard 17.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove non-degradable erosion-control measures after grass establishment period.

D. Retain one of the following two subparagraphs to match grass installation method.

1. Seeded areas must be protected from any traffic, other than for actual emergencies, for a period of 4 to 8 weeks, or until grass is mature enough to handle traffic.
2. Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until root system has penetrated into subsoil.

E. Remove nondegradable erosion-control measures after grass establishment period.

F. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

3.10 PERFORMANCE WARRANTY

A. The turf or grasses shall be guaranteed for 1 year from the date of the Land Disturbance Permit Termination.

B. In the event that any turf does not meet the design intention, the contractor shall replace or repair all unsatisfactory turf.

a. All repair work shall be guaranteed for 1 year from the date of repair acceptance.

APPENDIX I.1: PLANTING SOILS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Preparing and reshaping subgrade into planting subsoil.
   2. Amending and spreading existing soils.
   3. Importing and spreading soils.
   4. Edging to landscape soil areas.
   5. Finish grading.
   6. Landscape soil reinforcing/stabilizing.
   7. Landscape soil erosion control.
   8. Inorganic mulching.

1.3 REFERENCED STANDARDS

A. American Society for Testing and Materials:
   1. ASTM C136-84a - Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D422-63 (1972) - Method for Particle Size Analysis of Soils
   3. ASTM D2607-69 - Classification of Peats, Mosses, Humus, and Related Products.
   4. ASTM D2974-84 - Test Method for Moisture, Ash, and Organic Matter of Peat Materials.
   5. ASTM D2976-71 (1981) - Test Method for pH of Peat Materials.
   6. ASTM D5268-92 - Standard Specification for Topsoil Used for Landscaping Purposes.

B. United States Department of Agriculture:
   1. USDA Soil Particle Size & Texture Classes.

C. Association of Official Agricultural Chemists:
   1. AOAC Standards.

1.4 DEFINITIONS

A. Finish Grade: Elevation of finished surface.

B. Planting Topsoil: Proposed upper horizon of soil in planting areas that may or may not contain a large proportion of Topsoil. If conforming, sources may include existing topsoil un-amended or amended, imported topsoil amended or un-amended and manufactured and/or imported soil mixes amended or un-amended. Planting Topsoil shall consist of the same base material as the Planting Subsoil except with additional organic matter worked into it.

C. Planting Subsoil: Proposed lower horizon of soil in planting areas between the Planting Topsoil and the Subgrade. If conforming, sources can include existing subsoil un-amended or amended; existing subgrade un-amended or amended, manufactured and/or imported subsoil amended.

D. Planting Soils: Proposed Planting Soil profile made up of amended Subgrade, Planting Subsoil, Planting Topsoil and Mulch layer.

E. Topsoil: Surface 'A' horizon from natural or cultivated surface profile (not including bogs or wetlands) containing organic matter, sand, silt, and clay particles. It shall be friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil. It shall be free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials. Percentage by mass and pH shall be consistent with the VESCH.

F. Subsoil: Lower 'B' horizon from a natural or cultivated soil profile (not including bogs or wetlands) containing less organic matter than overlying topsoil.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials. Subgrade resulting from Earthworks may or may not be suitable for plant growth and shall be amended.

1.5 SYSTEM DESCRIPTION

A. Design Requirement: Test, adapt and refine Planting Soil mix design to suit the performance requirements, locally available materials, project site conditions, and mock up performance. Mix design includes but is not limited to the proportion of components, amendment types and their application rates.

B. Performance Requirement: Be responsible for all means, techniques and methods to achieve the soil characteristics specified.

1.6 SUBMITTALS

A. Suppliers and Subcontractors: Submit written particulars of all proposed suppliers before ordering of materials.

B. Supply Difficulties: Notify Smithsonian Institution immediately if any supply difficulties are encountered. No extension of time will be granted if any material or product is not available because of late ordering.

C. Alternatives: Submit list of proposed alternative materials within 14 days of contract award. Alternatives shall not be permissible after this time.

D. Product Data: For manufactured products submit data sheets with samples.

E. Qualifications: Submit qualifications of proposed testing laboratory for approval before sampling.

F. Samples for Verification: For each of the following:
   1. 5 lb (2.2 kg) of each type of proposed Planting Soil required, in labeled plastic bags showing sample name, location and date. Submit at least 28 days prior to ordering or processing. Submit only samples that conform as evidenced by the Soil Reports.
   2. 5 lb (2.2 kg) of mulch for each color and texture required, in labeled plastic bags.
   3. Edging materials and accessories, of manufacturer's standard size, to verify color selected.

G. Source Quality Control - Soils Report:
   1. Planting Subsoil & Planting Topsoil - For each proposed type, submit Soils Report describing all components, composition, amendments, test results, analysis, trial results and interpretations and source location at least 28 days prior to ordering or processing.

H. Field Quality Control - Soils Report:

1. Amended Subgrade - For each type, submit test results at least 14 days prior to planting.
2. Planting Soils - For each placed type, submit test results showing compliance of soils after the first area is planted but before soil is spread in remaining areas.

I. Approval by SI of submitted product data, samples, test reports, and certificates, shall not constitute final acceptance.

1.7 QUALITY ASSURANCE

A. Soil-Testing Laboratory Qualifications: Laboratory shall be an approved independent laboratory, recognized by the local State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed. Provide the laboratory with representative samples and a copy of the Contract Document Planting Plans, Schedules and Specifications. Test, analyze and interpret in accordance with current AOAC standards.

B. Soil Reports: As a minimum include the following in each Soil Report;

1. Sampling: Methods used to achieve a true representation of soil variability.
2. Soil Analysis: Test for the specified characteristics. USDA Texture shall be tested to ASTM D 422-63 and presented in graph form. Continue to sample and retest until each proposed soil type conforms to the specified characteristics. Contractor to pay for all such testing.
3. All topsoil shall be tested by a recognized laboratory for the following criteria:
   a. Organic matter content shall be not less than 1.5% by weight.
   b. pH range shall be from 6.0-7.5. If pH is less than 6.0, lime shall be added in accordance with soil test results or in accordance with the recommendations of the vegetative establishment practice being used.
   c. Soluble salts shall not exceed 500 ppm.
   d. If additional off-site topsoil is needed, it must meet the standards stated above.
4. Interpretation: Report on suitability of each proposed soil type for growing plants indicated on the Plant Schedule and propose recommended quantities of amendments to be added to produce conforming soils. Substantiate with data and/or research any proposed alternatives.
5. Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.
6. Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 2 inches to ensure bonding of the topsoil and subsoil.

C. Amendment Trial: If amendments or modifications are proposed to soils, perform trials and retest to show conformance prior to finalizing Soil Reports. Undertake trial amendments or modifications with same methods, techniques and/or equipment as proposed for execution.
1. Minimum Trial volume for each soil type – 5 cubic yards.
2. Perform amendment trials for both soils stored offsite and on-site soils.

D. Shop Drawings: Submit calculations, site layout drawings and anchoring details of Cellular Confinement System in accordance with Manufacturer's written recommendations specific to the project application.

E. Field Observation: Give not less than 10 working days' notice so that field observations may be made of the following:

1. Prepared Planting Subsoil prior to spreading Planting Topsoil.
2. Fine grading operations.

F. Surveyor Qualifications: An independent licensed surveyor, acceptable to authorities having jurisdiction and experienced in ground surveys.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Prevent spillage when hauling on or adjacent to Smithsonian property. In the event that spillage occurs, remove all spillage and sweep, wash, or otherwise clean such streets or open areas as required by State Authorities.

B. Take precautions to prevent a dust nuisance to adjacent public or private properties and to prevent erosion and transportation of soil to downstream or adjacent properties due to work under this Contract. At project site exit, clean dirt from tires. Do not track dirt out of construction area.

C. Prior to delivery, propose suitable stockpile locations. Stockpile to a 6-foot high maximum and protect from traffic, wind and water erosion. Provide temporary seeding and/or erosion control measures as approved by SI. Topsoil shall be stockpiled in such a manner that natural drainage is not obstructed and no off-site sediment damage shall result. Stabilize or protect stockpiles in accordance with MS #2. Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 14 days (refer to MS #1 and MS #2).

D. Protect inorganic mulch from contamination by foreign materials. Isolate stockpiles to prevent mixing of different aggregate grades. Prevent contamination by organic materials.

E. Use quality control sampling and testing to ensure that delivered materials match the approved samples/mockups and the specified criteria.

F. Before Planting Soils are redistributed from stockpiles, ensure a uniform mix of soils, free of subgrade lenses and other irregularities.

1.9 PROJECT CONDITIONS

A. Existing Soil Tests: Soil testing (geotechnical) for design purposes has been prepared for the Smithsonian Institution. This information is not intended as a representation, or to warranty the continuity, of such conditions between soil tests. Smithsonian Institution shall not be responsible for interpretations or conclusions drawn therefrom. The data is made available only for information and not for construction. Make any additional tests and other exploratory operations at no cost Smithsonian Institution.

B. Existing Soil Volumes: Smithsonian Institution may have existing soil that may be suitable for reuse. Smithsonian Institution shall not be responsible for interpretations or conclusions drawn concerning the actual volume of conforming soil that may be recovered nor the volume of actual unsuitable material remaining. Make any additional tests and other exploratory operations at no cost to Smithsonian Institution.

1.10 SEQUENCING

A. Coordination with Utilities: Ensure the works are staged and sequenced to:
1. Minimize tracking of equipment and compaction of planting areas. Compacted soil must be reworked to comply with specifications.

2. Prevent mixing, contamination or reversing soil profile from utility excavations and back filling. Repair any disturbance to the soil layers after placing to comply with the specified requirements.

B. Slopes Steeper than 1 in 3:
   1. Complete all work on slopes (irrigation pipes, soil, erosion control etc.) before surrounding flatter areas are prepared for Planting Soil.

1.11 COORDINATION

A. Coordinating stockpiles: Be responsible for any necessary temporary storage and staging of soil works including relocating stockpiles to accommodate the scheduling of other work.

PART 2 – PRODUCTS

2.1 PLANTING SOILS GENERALLY

A. Allowed Sources:
   1. Reuse existing soils stockpiled on-site. Verify suitability of stockpiled soil to produce Planting Soil Profile including but not limited to amendments, raking and/or screening.
   2. Supplement with imported or manufactured soils from off-site sources when quantities are insufficient.
   3. Import soil or manufactured soil from off-site sources.
   4. Amend existing in-place soils to produce Planting Soils. Verify suitability of stockpiled soil to produce Planting Soil including but not limited to amendments, raking and/or screening.

B. Disallowed Sources:
   1. Do not use soil from USDA Classified Prime Farmland.

C. Blending and Batching: Ensure Planting Soil has uniform color and texture for each vegetation type and blend materials uniformly and thoroughly incorporate soil amendments to assure uniform distribution. For each soil type, use only a single supply source for the entire quantity required.

D. All planting soils shall be free from gravel and debris.

2.2 AMENDED SUBGRADE

A. Amended Subgrade Characteristics: As applicable, amended subgrade shall conform to the following characteristics.

Property	Unit	Amended Subgrade
Physical		
Bulk density – moist	lb/ft^3 (kg/m^3)	< (1600)
Organic matter	Content shall be not less than 1.5% by weight	
Solid materials size	inch(mm)	< 4 (100)
Solid materials content	%Vol	< 20
Infiltration	inch/hr.	1 to 3
Chemical		
pH	$CaCl_2$	5-6.5
EC	dS/m	< 2
Toxins		
Oil	No visual evidence in top 6 inches	

Property	Unit	Common to each hori-zon	Type 1 Planting Subsoil	Type 1 Planting Topsoil
Physical				
Texture by particle size distribution analysis	USDA		sandy loam	Loam to sandy loam
Air filled porosity	%Vol		5 - 25	10 - 25
Bulk density - dry	lb/ft3 (kg/m3)	NA		
Bulk density - moist	lb/ft3 (kg/m3)	<90 (1440)		
Organic content - dry	%mass		1 - 2	4 - 5
Solid materials size	inch(mm)	< 0.5 (13)		
Solid materials content	%Vol	< 5		
Water stable aggregation	%	>30		
Infiltration	inch/hr	1 to 3		
Temperature	^{o}C	NA		
Chemical				
pH	$CaCl_2$	5-6.5		
EC	dS/m	< 2		
Cg / Mg	ratio	3 to 6		
CEC cation exch. Capacity	meq%	5 to 20		
ESP exch. Sodium	%	< 5		
SAR	ratio	< 6		
N nitrogen as ammonium	ppm	6 to 24		
N nitrogen as nitrate	ppm	30 to 100		
P phosphorus	ppm	3 to 18		
K potassium	ppm	25 to 110		
S sulphur	ppm	< 200		
Cu copper	ppm	0.4 to 6		
Zn zinc	ppm	0.3 to 10		
Mn manganese	ppm	3 to 15		
Fe iron	ppm	3 to 20		
B boron	ppm	0.3 to 1		
Odor		no strong odor		
Toxins				
Heavy metals & toxins	ppm	< EPA & Local State acceptable levels		
Biological				
Micro organisms other than parasitic nematodes		present		
Mycorrhiza fungi		present		
Fungal diseases		absent		
Weed viable reproductive parts		absent		

Planting Soil component proportions by volume:

1. For Broadleaves
    a. 40% Existing subsoil
    b. 45% Imported topsoil & sand
    c. 15% Organic amendment

2. For Conifers
    a. 10% Existing subsoil
    b. 65% Imported topsoil & sand
    c. 25% Organic amendment
3. For Grass Areas
    a. 1 inch compost missed homogenously into top 6 inches of subsoil on site.

B. Planting Soil component proportions by volume:
1. Topsoil 40%
2. Sand 10%
3. Peat 20%
4. Compost 10%
5. Wood Derivatives 20%
6. To each cubic yard of mix add:
    a. Amendments as required by the Soils Report.

C. Planting Soil component proportions by volume:
   1. For Planting Subsoil
      a. 100% Imported Topsoil or Subsoil
   2. For Planting Topsoil
      a. 90% minimum Planting Subsoil amended with,
      b. 10% maximum composted organic matter,
      c. Other amendments to suit species as identified in the Soils Report.

APPENDIX 6 – VSMP PERMIT REQUEST FOR TERMIANTION

Notice of Termination
General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10)

(Please Type or Print All Information)

1. **Construction Activity Operator:**

   Name:_____

   Contact:_____

   Mailing Address:_____

   City:_____ State:_____ Zip:_____ Phone: _____

   Email address (if available):_____

2. **Name and Location of the Construction Activity:** (As listed on the Registration Statement.)

   Name:_____

   Address (if available):_____

   City:_____ State:_____Zip:_____

   County (if not located within a City):_____

   Latitude (decimal degrees):_____Longitude (decimal degrees):_____

3. **General Permit Registration Number:**_____

4. **Reason for Terminating Coverage Under the General Permit:** (The operator shall submit a Notice of Termination after one or more of the following conditions have been met.)

   ☐ A. Necessary permanent control measures included in the SWPPP for the site are in place and functioning effectively and final stabilization has been achieved on all portions of the site for which the operator is responsible. When applicable, long-term responsibility and maintenance requirements for permanent control measures shall be recorded in the local land records prior to the submission of a notice of termination;

   ☐ B. Another operator has assumed control over all areas of the site that have not been finally stabilized and obtained coverage for the ongoing discharge;

   ☐ C. Coverage under an alternative VPDES or state permit has been obtained; or

   ☐ D. For residential construction only, temporary soil stabilization has been completed and the residence has been transferred to the homeowner.

   The notice of termination should be submitted no later than 30 days after one of the above conditions being met. Authorization to discharge terminates at midnight on the date that the notice of termination is submitted for the conditions set forth in subsections B through D above, unless otherwise notified by the VSMP authority or the Department. Termination of authorizations to discharge for the conditions set forth in subsection A above shall be effective upon notification from the Department that the provisions of subsection A have been met or 60 days after submittal of the notice of terminations, whichever occurs first.

5. **Permanent Control Measures Installed:** (When applicable, a list of the on-site and off-site permanent control measures (both structural and nonstructural) that were installed to comply with the stormwater management technical criteria. Attach a separate list if additional space is needed.)

   Permanent Control Measure #1

   Type of Permanent Control Measure:_____

   Date Functional:_____

   Address (if available):_____

   City:_____ State:_____Zip:_____

   County (if not located within a City):_____

   Latitude (decimal degrees):_____Longitude (decimal degrees):_____

   Receiving Water:_____

   Total Acres Treated:_____Impervious Acres Treated:_____

Permanent Control Measure #2

Type of Permanent Control Measure:_____

Date Functional:_____

Address (if available):_____

City:_____ State:_____ Zip:_____

County (if not located within a City):_____

Latitude (decimal degrees):_____ Longitude (decimal degrees):_____

Receiving Water:_____

Total Acres Treated:_____ Impervious Acres Treated:_____

Permanent Control Measure #3

Type of Permanent Control Measure:_____

Date Functional:_____

Address (if available):_____

City:_____ State:_____ Zip:_____

County (if not located within a City):_____

Latitude (decimal degrees):_____ Longitude (decimal degrees):_____

Receiving Water:_____

Total Acres Treated:_____ Impervious Acres Treated:_____

6. **Participation in a Regional Stormwater Management Plan:** (When applicable, information related to the participation in a regional stormwater management plan. Attach a separate list if additional space is needed.)

Regional Stormwater Management Facility

Type of Regional Stormwater Management Facility:_____

Address (if available):_____

City:_____ State:_____ Zip:_____

County (if not located within a City):_____

Latitude (decimal degrees):_____ Longitude (decimal degrees):_____

Total Site Acres Treated:_____ Impervious Site Acres Treated:_____

7. **Perpetual Nutrient Credits:** (When applicable, information related to perpetual nutrient credits that were acquired in accordance with § 62.1-44.15:35 of the Code of Virginia. Attach a separate list if additional space is needed.)

Nonpoint Nutrient Credit Generating Entity

Name:_____

Perpetual Nutrient Credits Acquired (lbs/acre/year):_____

8. **Certification:** "I certify under penalty of law that I have read and understand this Notice of Termination and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

Printed Name:_____ Title:_____

Signature:_____ Date:_____

(Please sign in INK. This Certification must be signed by the appropriate person associated with the operator identified in Item #1.)

Instructions for Completing the Notice of Termination
General VDPES Permit for Discharges of Stormwater from Construction Activities (VAR10)

GENERAL

A Notice of Termination must be submitted when an operator no longer wishes to be covered under the General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10).

All Notice of Terminations should be submitted to:

Department of Environmental Quality
Office of Stormwater Management, 10th Floor
P.O. Box 1105
Richmond, VA 23218

LINE-BY-LINE INSTRUCTIONS

Item 1: Construction Activity Operator Information.

Provide the legal name (do not use a colloquial name), contact, mailing address, telephone number, and email address (if available) of the construction activity operator that was issued general permit coverage.

Item 2: Name and Location of the Construction Activity Information.

Provide the official name, street address (if available), city or county (if not located within a City) of the construction activity. Also, provide the latitude and longitude in decimal degrees of the approximate center of the construction activity (e.g., N 37.5000, W 77.5000). NOTE: This information can be obtained from the previously submitted Registration Statement.

Item 3: General Permit Registration Number.

Provide the existing general permit registration number for the construction activity identified in Item 2.

Item 4: Reason for Termination.

Indicate the appropriate reason for submitting this Notice of Termination. The Notice of Termination may only be submitted after one or more of the following conditions have been met:

a. Necessary permanent control measures included in the SWPPP for the site are in place and functioning effectively and final stabilization has been achieved on all portions of the site for which the operator is responsible. When applicable, long-term responsibility and maintenance requirements for permanent control measures shall be recorded in the local land records prior to the submission of a notice of termination;

b. Another operator has assumed control over all areas of the site that have not been finally stabilized and obtained coverage for the ongoing discharge;

c. Coverage under an alternative VPDES or state permit has been obtained; or

d. For residential construction only, temporary soil stabilization has been completed and the residence has been transferred to the homeowner.

The Notice of Termination should be submitted no later than 30 days after one of the above conditions being met.

Item 5: Permanent Control Measures (when applicable).

For each on-site and off-site permanent control measure (both structural and non-structural) that was installed to comply with the stormwater management technical criteria provide the following information:

a. The type of permanent control measure;

b. The date that the permanent control measure became functional as a post-development stormwater management control;

c. The street address (if available), City or County (if not located within a City) of the permanent control measure;

d. The latitude and longitude in decimal degrees of the approximate center of the permanent control measure;

e. The receiving water of the permanent control measure; and

f. The number of total and impervious acres treated by the permanent control measure (to the nearest one-tenth of an acre).

Attach a separate list if additional space is needed.

Item 6: Participation in a Regional Stormwater Management Plan (when applicable).

For each Regional Stormwater Management Facility provide the following information:

a. The type of regional facility to which the site contributes;

b. The street address (if available), City or County (if not located within a City) of the regional facility;

c. The latitude and longitude in decimal degrees of the approximate center of the regional facility; and

d. The number of total and impervious site acres treated by the regional facility (to the nearest one-tenth of an acre).

Attach a separate list if additional space is needed.

Item 7: Perpetual Nutrient Credits (when applicable).

Provide the following information related to perpetual nutrient credits that were acquired in accordance with § 62.1-44.15:35 of the Code of Virginia:

a. The name of the nonpoint nutrient credit generating entity from which perpetual nutrient credits were acquired; and

b. The number of perpetual nutrient credits acquired (lbs. per acre per year).

Attach a separate list if additional space is needed.

Item 8: Certification.

A properly authorized individual associated with the operator identified in Item 1 of the Registration Statement is responsible for certifying and signing the Registration Statement. **Please sign the Registration Statement in INK.**

State statutes provide for severe penalties for submitting false information on the Registration Statement. State regulations require that the Registration Statement be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this part, a responsible corporate officer means:

(i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-making or decision-making functions for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated

facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

c. For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this part, a principal executive officer of a public agency includes:

(i) The chief executive officer of the agency, or

(ii) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

APPENDIX 7 – CURRENT AND FUTURE LAND DISTURBING ACTIVITIES

Current & Future Land Disturbing Projects						
Project Name/Project Number	**Total Disturbed Area (ac)**	**Projected Timeline**		**Location (Intersection, latitude, longitude)**	**Site Project Manager and/or RLD (Name, Phone #)**	**Project Description**
		Start	**Finish**			
Projects Currently Under Construction						
Building 1 Renovation	0.88	September 2018	September 2020	1500 Remount Rd Front Royal, VA	AJ Quayle 717-372-0062	Building renovations and two (2) bioretention facilities
Utility Upgrades Phase III (Priority A)	>1 Ac	November 2018	March 2020	1500 Remount Rd Front Royal, VA	Ron Whitfield RLD#05652	Utility upgrades
2018-2019 Proposed/Potential Future Construction Projects						
Utility Upgrades Phase III (Priority D)	>1 Ac	TBD	TBD	1500 Remount Rd Front Royal, VA	Ron Whitfield RLD#05652	Utility upgrades

APPENDIX 8 –ESC TECHNICAL BULLETIN #4

Erosion & Sediment Control Technical Bulletin No. 4

Nutrient Management for Development Sites

PRINCIPLE

This Erosion & Sediment Control Technical Bulletin updates the vegetative cover standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass of the *1992 Virginia Erosion and Sediment Control Handbook*, in accordance with the *1995 Virginia Nutrient Management Standards and Criteria*. Specifically, the vegetation standards and specifications have been updated to reflect that no more than one (1) pound of water soluble nitrogen per 1,000 square feet is to be applied on construction sites in a 30 day period. Attached are one-page updates to the vegetative cover standards and specifications, which provide updated fertilizer and lime rates and the seeding schedules for the different physiographic regions of Virginia.

This document also discusses the need to ensure healthy vegetative growth by promoting a fertile soil as a crucial step in the establishment of vegetation, which can reduce the amount of nutrients (fertilizers) required to maintain a good vegetative cover.

THE IMPORTANCE OF URBAN NUTRIENT MANAGEMENT

Nutrients in urban runoff have been identified as being a significant contributor to the decline of the Chesapeake Bay, as well as Virginia's rivers, lakes, streams and groundwater. Improper timing or over application of plant nutrients is a major cause of non-point source pollution that can result in the impairment of Virginia's groundwater and surface waters. Runoff that carries nitrogen or phosphorus can lead to the increased growth of algae and aquatic weeds, de-oxygenation, and reduced water clarity, which degrades water quality and stresses underwater plant and animal life.

Typical land development practices degrade soil quality and make it difficult to establish lawns and landscaped areas. In the course of development, soil rich in organic material is often stripped, compacted, buried under subsoil, or removed and replaced with shallower depths of lower quality, imported soil or fill material. Properly establishing an appropriate and uniform vegetative cover as quickly as possible on denuded sites plays an extremely important role in reducing erosion and minimizing sedimentation to downstream waterways.

Nutrient management on construction sites helps prevent the pollution and degradation of state waters. Not only are there economic benefits of applying less fertilizer, nutrient reduction can be achieved by applying fertilizer more efficiently. In short, nutrient management is an environmentally and economically sound practice for restoring waters in Virginia and involves the implementation of practices that promote vegetative cover in developing areas while protecting water quality.

ESTABLISHMENT OF VEGETATIVE COVER

Developing a fertile soil is a crucial step in the establishment of vegetation, which can reduce the amount of fertilizer required to maintain good vegetative cover. A fertile soil has the capacity to supply the nutritional needs of the plants being established. Good soil quality characteristics include good soil texture, adequate nutrients available for plant growth, good moisture holding capacity, and the appropriate soil acidity/alkalinity balance (pH). The following is a discussion of the steps needed to ensure good vegetative growth.

1. Soil Tests

Soil tests are extremely important and should be conducted on every site. Soil tests provide specific information on the amounts of phosphorus, potassium, calcium and magnesium available for plant uptake and recommends additional amounts as required. Soil tests are crucial for determining the amount of lime needed to obtain an appropriate soil pH for the vegetation being established. Soil test results include recommendations specific to the site and vegetation being grown. Soil tests recommend the amount of plant nutrients and lime needed to promote and maintain good plant growth. Soil tests may be performed by the Cooperative Extension Service Soil Testing Laboratory at VPI & SU, or by a reputable commercial laboratory. Also note that County Extension offices have soil testing supplies and information.

Soil tests are not used to determine nitrogen needs. Nitrogen is applied based upon established requirements for the plant to be grown, season of growth, and intended use.

2. Surface Roughening

Provide a rough soil surface by stair-step grading, grooving, or tracking the soil to be vegetated or by leaving slopes in a roughened condition by not fine-grading, in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.29). Seed germination is difficult with compacted soils. Rough, loose soil surfaces helps prevent the loss of lime and fertilizer due to runoff, increases water infiltration, and provides seed coverage, which aids in seed germination.

3. Soil Amendments & Soil Quality

Materials such as sand, vermiculite, peat, and compost may be added to soil to modify texture, improve structure and increase the moisture holding capacity. It is also recommended to conserve existing soil quality by preserving and reapplying topsoil in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.30). Areas that have been compacted, or where duff or underlying topsoil is removed, should be amended with compost to improve soil quality.

4. Lime

Adjusting the soil pH between 6.25 to 6.5 is extremely important for grass establishment, especially in the acidic soils of Virginia. A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of denuded sites. However, when a soil test has not been performed, apply 2-tons/acre (90 pounds per 1,000 square feet) of pulverized agricultural grade limestone.

5. Fertilizer
Never apply more than 1 pound of water soluble nitrogen per 1,000 square feet within a 30 day period. Nitrogen should be applied based upon established requirements of the plant to be grown, season of growth, and intended use. Establishing a uniform dense vegetative cover with a good root system reduces the potential for pollution by decreasing erosion and runoff, increasing the plants ability for nutrient uptake, and reducing pesticide use. A detailed discussion on fertilizer use is provided in the 'Updated Fertilizer Specifications and Rates for Establishment' section of this bulletin.

6. Incorporation
Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by discing or by other means. Incorporation reduces the potential nutrient loss due to runoff, as well as significantly increasing the success of establishing a vegetative cover. When surface roughening does not occur prior to the application of lime and fertilizer, 'mix' the lime and fertilizer into the soil, at least 4 inches, by the methods described in the *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.29).

When incorporation does not occur, and fertilizer and lime is applied directly to a smooth surface, the phosphorus (P_2O_5) application rate must be reduced by half because of the limited contact area with soil and the risk of nutrients being lost in runoff.

7. Seeding
Selection of plants is based on climate, topography, soils, land use and the planting season. The *1992 Virginia Erosion and Sediment Control Handbook* vegetative cover standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass, describe in detail the specifications for plant selection. In addition, attached are one-page updates to the vegetative cover standards and specifications, which provide updated fertilizer and lime rates and the seeding schedules for the different physiographic regions of Virginia.

8. Mulching
The application of mulch to the soil surface, for both temporary and permanent seeding, is one of the most effective means of controlling runoff and erosion on disturbed land. All permanent seeding must be mulched immediately upon completion of seed application. It is especially important to mulch liberally in mid-summer and prior to winter. Mulching prevents erosion, and thereby pollution, by protecting the soil surface and fostering the growth of vegetation by increasing the moisture content and providing insulation from extreme temperatures. The *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.35) details the mulch specifications and includes a list of the typical materials used to mulch (for example straw, wood chips, and fiber mulch).
.

9. Hydroseeding
Hydroseeding is a mechanical method of applying seed, fertilizer, and mulch to land development sites in one step. This method is efficient in providing an immediate cover to denuded sites; however, the surface must be carefully prepared in order for successful seed germination. Hydroseed on rough, loose surfaces only. Roughen the surface prior to application of hydroseeding, per the specification above and in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.29). Although proper soil pH is crucial in establishing good vegetative cover, lime is usually not included in the hydroseed mix. Therefore, lime should be incorporated into the soil as needed when preparing the site for hydroseeding.

To avoid poor seed germination as a result of seed damage during hydroseeding, it is recommended that if the machinery breaks down from 30 minutes to 2 hours, 50% more seed must be added to the tank. Beyond 2 hours, a full rate of new seed is usually necessary.

UPDATED FERTILIZER SPECIFICATIONS AND RATES FOR ESTABLISHMENT

Plant nutrients should be applied based upon established requirements of the plant to be grown, season of growth, and intended use, as specified in the *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.31, 3.32, 3.33, and 3.34). The timing and rate of fertilizer application depends on the type of grass. There are basically two types of grasses, warm and cool season grasses. Warm season grasses (Bermuda, Zoysia) are those that go dormant in the winter. Cool season grasses (Fescue, Bluegrass) are those that stay green year round.

1. Recommended Season for Applying Nitrogen Fertilizers
The earliest spring application of nitrogen for **cool season** grasses is six weeks prior to the last average frost date (for example, February 6 for Virginia Beach and March 1 for Roanoke). The latest fall application of nitrogen for **cool season** grasses is six weeks after the first average frost date (for example, December 29 for Virginia Beach and December 1 for Roanoke).

The earliest spring application of nitrogen for **warm season** grasses is the last average frost date for the region (for example, March 20 for Virginia Beach and April 15 for Roanoke). The latest fall application of nitrogen for **warm season** grasses is 30 days prior to the average first frost date for the region (for example, October 15 for Virginia Beach and September 20 for Roanoke).

2. Per Application Rates
Phosphorus (P) and potassium (K) fertilizer requirements should be determined by a soil test. Never apply more than one (1) pound of water soluble nitrogen per 1,000 square feet within a 30 day period. The following table itemizes the fertilization rate revisions to standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass Establishment.

Summary of Fertilizer Specification Revisions for Establishment of Turf

Standards & Specifications		2003 Urban Nutrient Management Technical Bulletin
3.31 Temporary Seeding		**10-10-10** fertilizer applied at a rate of **450** lbs. / acre or **10** lbs. / 1,000 ft^2
3.32 Permanent Seeding	Mixed Grasses & Legumes	**10-20-10** fertilizer applied at a rate of **500** lbs. / acre or **12** lbs. / 1,000 ft^2
	Legume stands only	Apply the equivalent of 100 lbs. of phosphate (P_2O_5) and 100 lbs. of Potash (K_2O) per acre. NO NITROGEN (N)
	Grass stands only	**10-20-10** fertilizer applied at a rate of **500** lbs. / acre or **12** lbs. / 1,000 ft^2
3.33 Sodding		**10-10-10** fertilizer applied at a rate of **450** lbs. / acre or **10** lbs. / 1,000 ft^2. NOTE: For cool season grasses apply fertilizer in fall or spring. For warm season grasses apply the fertilizer in late spring or summer only.
3.34 Bermudagrass & Zoysiagrass Establishment		**10-10-10** fertilizer applied at a rate of **500** lbs. / acre or **12** lbs. / 1,000 ft^2. Apply additional phosphorus and potassium 30-60 days later based on the soil test. Apply an additional equivalent of 1 lb./1,000 ft^2 of nitrogen when the P & K are applied.

3. Using Fertilizer Analysis to Calculate Nitrogen Rates

All fertilizer packages have three numbers present on the package (for example, 10-10-10 or 16-4-8). These three numbers indicate the percentage of nitrogen (N), phosphorus (P_2O_5), and potash (K_2O) present by weight which is called the N-P-K ratio. For example, a 20 pound bag of 10-6-4 is 10 percent nitrogen (2 lb. of N), 6 percent phosphate (1.2 lb. of P_2O_5), and 4 percent potash (0.8 lb. of K_2O) the remaining is inert material to facilitate even application of fertilizer.

The Virginia nutrient management recommendation is to apply no more than 1 lb. of nitrogen per 1,000 square feet within a 30 day period. A fertilization rate of 1 lb. of nitrogen per 1,000 square feet can be obtained for any site by using the fertilizer analyses on the bag and knowing the area of application.

Fertilizer Bag Reads:	Amount to Fertilizer to Apply 1 lb. of nitrogen / 1000 sq.ft.
6-2-0	16.6 lb.
10-10-10	10 lb.
16-4-8	6.2 lb.
20-5-5	5 lb.
22-3-14	4.5 lb.
29-3-7	3.4 lb.

4. Use of Slowly Available Forms of Nitrogen
Fertilizer bags will state the source or category from which the nitrogen is derived. Nitrogen fertilizers have two categories: Water Soluble Nitrogen (i.e., all nitrogen is immediately available); and Slowly Available Nitrogen (i.e., nitrogen is available over an extended period of time). The nitrogen source impacts how grass is fertilized and the rate and timing of application of fertilizer.

Choose a fertilizer that has some amount of Slowly Available Nitrogen (SAN). Slowly available nitrogen fertilizers make nitrogen available a little at a time, the way most grasses need it, which reduces both the potential of excess nutrients in runoff and the leaching potential of excess nutrients into groundwater. Sources of SAN are usually stated on the label. It may be stated as % Water Insoluble Nitrogen (WIN), sulfur-coated urea, natural organic nitrogen or other controlled release materials used to coat the fertilizer. The % WIN is usually stated on the fertilizer container, if the % WIN is not listed, assume that all the nitrogen in the fertilizer is water soluble and immediately available. As a general guideline, if the fertilizer has 50% WIN or less, it should be applied in the same manner as readily available nitrogen. If the fertilizer is 50% WIN or greater, it should be applied as a SAN.

UPDATED FERTILIZER SPECIFICATIONS AND RATES FOR MANAGEMENT

1. Application of Fertilizer for Maintenance
Apply fertilizer when grass is actively growing and can utilize the nutrients. Summer is best for warm season grasses (zoysiagrass and bermudagrass) while the fall months are best for cool season grasses (tall fescue, Kentucky bluegrass, perennial ryegrass).

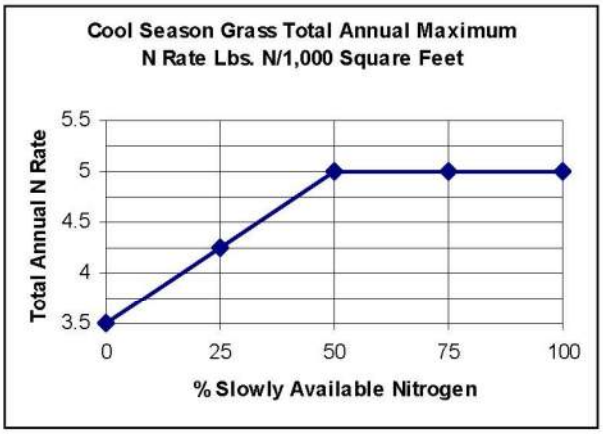
2. Annual Application Rates

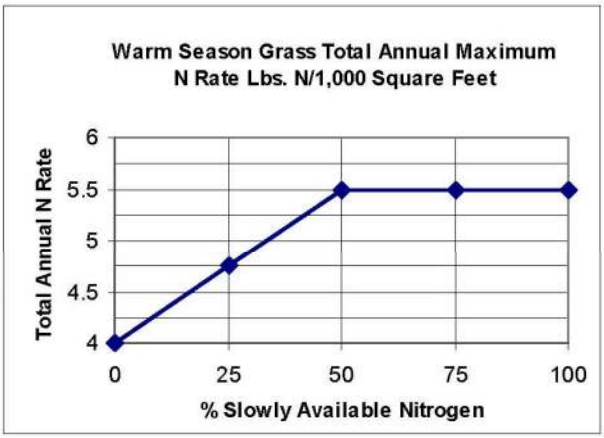
A. When applying 100% Water Soluble Nitrogen sources (those that have all the nitrogen immediately available for plant use), the following rates apply:

- Never apply more than one (1) pound of water soluble nitrogen per 1,000 square feet within a 30 day period
- No more than 3.5 lbs. of nitrogen per 1,000 square feet annually on **cool season** grass.
- No more than 4.0 lbs. of nitrogen per 1,000 square feet annually on **warm season** grass.

B. When applying slowly available nitrogen (SAN, WIN, sulfur-coated urea, natural organic nitrogen or other controlled release materials), total annual nitrogen application rates may be adjusted incrementally by referring to the following figure. The maximum annual nirogen rates when using 50% or greater SAN is as follows:

- No more than 5.0 lbs. of nitrogen per 1,000 square feet annually on **cool season** grass.
- No more than 5.5 lbs. of nitrogen per 1,000 square feet annually on **warm season** grass.





C. When applying maintenance fertilizer on established sod,

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is less than 50 percent WIN

Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
September	1	1	0	0
October	1	1	0	0
Early November	0	0	0	0
April	0	0	0	0
May	0-0.5	0-0.05	1	1
June	0	0	1	0
July/August	0	0	0	1
Yearly Lbs. N/1000 sf	2.5	2.5	2	2

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is more than 50 percent WIN

Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
August 15	1.5	1.5	0	0
October 1	1.5	1.5	0	0
April	0	0	1.5	1.5
May 15	0	0	0	0
June	0	0	1.5	1.5
Yearly Lbs. N/1000 sf	3	3	3	3

TABLE 3.31-B
(Revised June 2003)
TEMPORARY SEEDING SPECIFICATIONS
QUICK REFERENCE FOR ALL REGIONS

SEED		
APPLICATION DATES	**SPECIES**	**APPLICATION RATES**
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass (Iolium multi-florum) & Cereal (Winter) Rye (Secale cereale)	50 -100 (lbs/acre)
Feb. 16 - Apr. 30	Annual Ryegrass (Iolium multi-florum)	60 - 100 (lbs/acre)
May 1 - Aug. 31	German Millet	50 (lbs/acre)

FERTILIZER & LIME

- Apply 10-10-10 **fertilizer** at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:
1 - A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
2 - Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
3 - When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

TABLE 3.32-C
(Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR APPALACHIAN/MOUNTAIN AREA

SEED[1]		
LAND USE	**SPECIES**	**APPLICATION RATES**
Minimum Care Lawn (Commercial or Residential)	Tall Fescue[1] Perennial Ryegrass[2] Kentucky Bluegrass[1]	90-100% 0-10% 0-10% TOTAL: 200-250 lbs.
High-Maintenance Lawn	Minimum of three (3) up to five (5) varieties of Kentucky Bluegrass from approved list for use in Virginia[1]	TOTAL: 125 lbs.
General Slope (3:1 or less)	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[3]	128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[3] Crownvetch[4]	108 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html

2 - Perennial Ryegrass will germinate faster and at lower soil temperatures than Tall Fescues, thereby providing cover and erosion resistance for seedbed.

3 - Use seasonal nurse crop in accordance with seeding dates as stated below:

March, April - May 15th	Annual Rye
May 16th - August 15th	Foxtail Millet
August 16th - September, October	Annual Rye
November - February	Winter Rye

4 - All legume seed must be properly inoculated. If Flatpea is used, increase to 30 lbs/acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 **fertilizer** at a rate of **500** lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

TABLE 3.32-D
(Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR PIEDMONT AREA

SEED[1]		
LAND USE	**SPECIES**	**APPLICATION PER ACRE**
Minimum Care Lawn (Commercial or Residential)	Tall Fescue[1] Perennial Ryegrass Kentucky Bluegrass[1]	95-100% 0-5% 0-5% TOTAL: 175-200 lbs.
High-Maintenance Lawn	Tall Fescue[1]	TOTAL: 200-250 lbs.
General Slope (3:1 or less)	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[2]	128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[2] Crownvetch[3]	108 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

February 16th - April	Annual Rye
May 1st - August 15th	Foxtail Millet
August 16th - October	Annual Rye
November - February 15th	Winter Rye

3 - Substitute Sericea lespedeza for Crownvetch east of Farmville, VA (May through September use hulled seed, all other periods, use unhulled Sericea). If Flatpea is used, increase rate to 30 lbs./acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40

FERTILIZER & LIME

- Apply 10-20-10 **fertilizer** at a rate of **500** lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:
- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

TABLE 3.32-E
(Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR COASTAL PLAIN AREA

SEED[1]		
LAND USE	**SPECIES**	**APPLICATION RATES**
Minimum Care Lawn (Commercial or Residential)	Tall Fescue[1] **or** Bermudagrass[1]	175 - 200 lbs. 75 lbs.
High-Maintenance Lawn	Tall Fescue[1] **or** Bermudagrass[1] (seed) **or** Bermudagrass[1] (by other vegetative establishment method, see Std. & Spec. 3.34)	200-250 lbs. 40 lbs. (unhulled) 30 lbs. (hulled)
General Slope (3:1 or less)	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[2]	128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	Tall Fescue[1] Bermudagrass[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[2] Sericea Lespedeza[3]	93-108 lbs. 0-15 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

February, March - April	Annual Rye
May 1st - August	Foxtail Millet
September, October - November 15th	Annual Rye
November 16th - January	Winter Rye

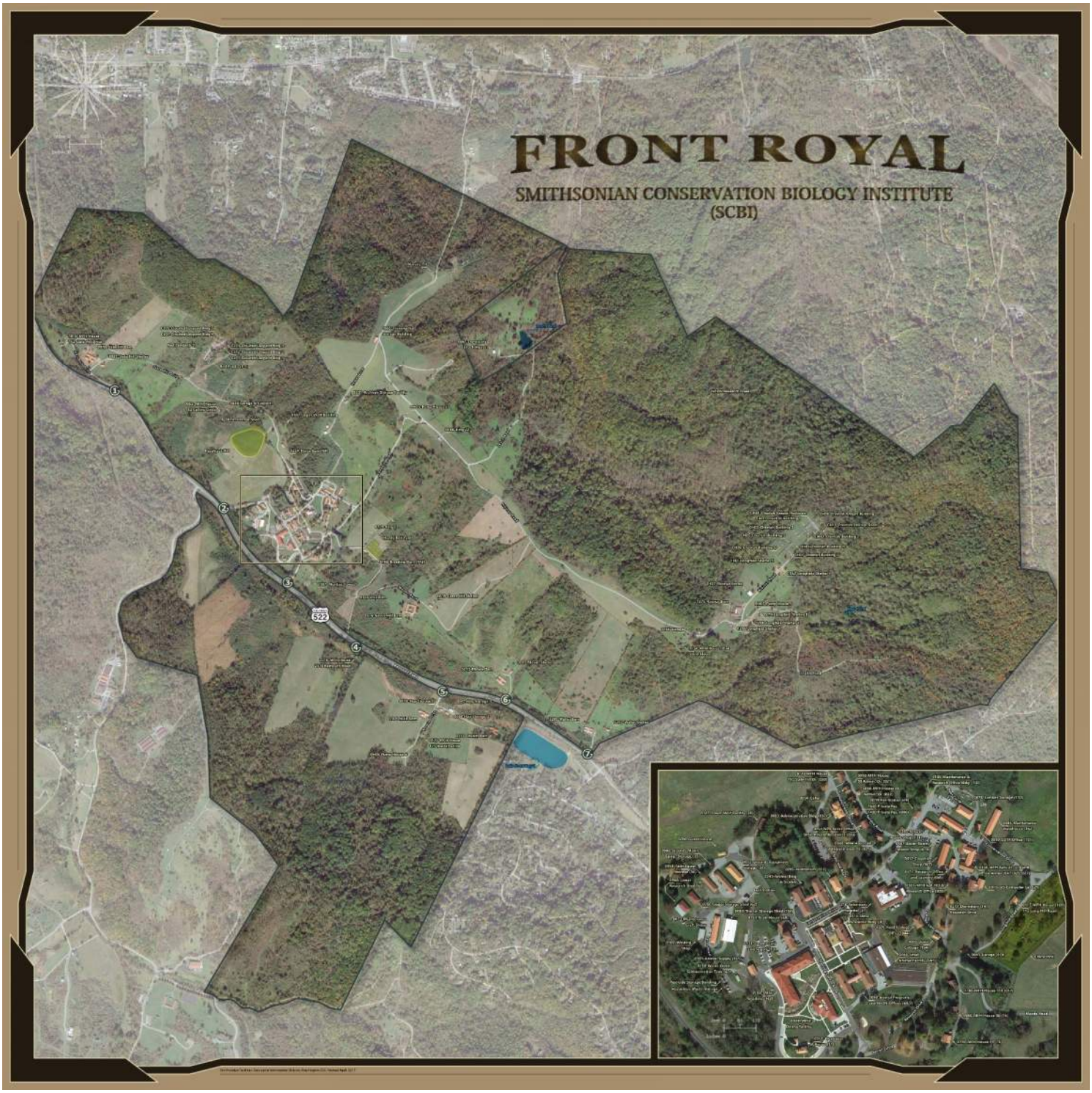
3 - May through October, use hulled seed. All other seeding periods, use unhulled seed. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 **fertilizer** at a rate of **500** lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:
- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

APPENDIX 9 – FRONT ROYAL SMITHSONIAN CONSERVATION BIOLOGY INSTITUTE (SCBI) MAP


FRONT ROYAL
SMITHSONIAN CONSERVATION BIOLOGY INSTITUTE
(SCBI)

APPENDIX 10 – BEST MANAGEMENT PRACTICE (BMP) CHECKLISTS

Note: Additional BMP checklists to added to this document as needed.

Construction Inspection Checklist: Bioretention

Bowman CONSULTING

Address/ Location: _____ Project Name/ Number: _____

Contractor: _____ Telephone: _____

Certifying Professional*: _____ Telephone: _____

Date Started: _____ Final Inspection Date: _____

**Certifying professional must be a licensed Professional Engineer (PE), Landscape Architect (LA) or Land Surveyor (LS) or DEQ Certified Inspector.*

The following checklist provides a basic outline of the anticipated items for the construction inspection of bioretention facilities. This checklist does not necessarily distinguish between all the design variations and differences in construction between the family of practices. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design is met. The standard for design of this practice is based on Virginia Stormwater BMP Clearinghouse .

All items should be checked when completed. **Items labeled "Certification of…" must be crossed off, dated and initialed by certifying inspector.**

	PRE-CONSTRUCTION MEETING	DATE
☐	Identify the tentative schedule for construction and verify the requirements and schedule for interim inspections.	
☐	All pervious areas of the contributing drainage areas have been adequately stabilized with a thick layer of vegetation or erosion control measures are still in place and stormwater has been diverted around the area.	
☐	Area of bioretention practice has not been impacted during construction.	
☐	Conduct a pre-construction meeting with the contractor designated to install the bioretention, the person completing this checklist, and the Stormwater inspector.	

	EXCAVATION	DATE
☐	Area of bioretention excavation is marked and the size and location conforms to plan.	
☐	If the excavation area has been used as a sediment trap: verify that the bottom elevation of the proposed stone reservoir is lower than the bottom elevation of the existing trap.	
☐	For Level 2 bioretention, ensure the bottom of the excavation is scarified prior to placement of stone.	
☐	Subgrade surface is free of rocks and roots, and large voids. Any voids should be refilled with the base aggregate to create a level surface for the placement of aggregates and underdrain (if required).	
☐	No groundwater seepage or standing water is present. Any standing water is dewatered to an acceptable dewatering device.	
☐	Excavation of the bioretention practice has achieved proper grades and the required geometry and elevations without compacting the bottom of the excavation. ***Constructed dimensions:*** _____	
☐	If sides of excavation are covered with geotextile; no tears, holes, or excessive wrinkles are present.	

☐	**Certification of Excavation Inspection:** Inspector certifies the successful completion of the excavation steps listed above. Photos required include: o Excavated area prior to installation of stone, including measurements (L x W x D); o Non-woven geotextile fabric installed on sides of excavated subgrade only. Material delivery ticket include: o Geotextile installed on sides	

FILTER LAYER, UNDERDRAIN, AND STONE RESERVOIR PLACEMENT		DATE
☐	All aggregates conform to specifications as certified by quarry.	
☐	Underdrain size and perforations meet the specifications (if applicable).	
☐	If the underdrain is directly tied into the public storm sewer system, the connection has been witnessed by DES inspector.	
☐	For Level 2 installations: placement of filter layer and initial lift of stone reservoir layer aggregates with underdrain or infiltration sump, spread (not dumped) to avoid aggregate segregation	
☐	Placement of underdrain, observation wells, and underdrain fittings are in accordance with the approved plans.	
☐	Elevations of underdrain and outlet structure are in accordance with approved plans, or as adjusted to meet field conditions and denoted in Comments section.	
☐	Placement of remaining lift of stone reservoir layer as needed to achieve the required reservoir depth.	
☐	**Certification of Filter Layer and Underdrain Placement Inspection:** Inspector certifies the successful completion of the filter layer and underdrain placement steps listed above. Photos and material delivery tickets for these items are attached. Photos required include: o Perforated underdrain pipe (if applicable) with a solid vertical overflow pipe; o Depth of #57 stone; o Depth of choker stone (pea gravel or #8); o Underdrain connection to public storm sewer system (if applicable). Material delivery tickets required include: o 57 stone; o Choker stone (pea gravel or #8).	

BIORETENTION SOIL MEDIA PLACEMENT		DATE
☐	Soil media is certified by supplier or contractor as meeting the project specifications and comes from an approved soil media vendor.	
☐	Soil media is placed in 12-inch lifts to the design top elevation of the bioretention area. Elevation has been verified after settlement (2 to 4 days after initial placement).	
☐	Side slopes of ponding area are feathered back at the required slope (no steeper than 3H:1V).	
☐	**Certification of Soil Media Placement Inspection:** Inspector certifies the successful completion of the soil media steps listed above and any necessary photos are attached. Photo required of a measurement of the soil media installed. Material delivery ticket required from an approved soil media vendor.	

PRETREATMENT AND PLANT INSTALLATION		DATE
☐	Riser, overflow weir, or other outflow structure is set to the proper elevation, receive the proper compaction and are functional.	
☐	Placement of energy dissipaters and pretreatment practices (forebays, gravel diaphragms, etc.) are installed in accordance with the approved plans.	
☐	Appropriate number and spacing of plants are installed in accordance with the approved plans. Microbioretentions use the appropriate number of plants from VA DEQ Table 9.4, bioretentions follow the approved landscape plan.	
☐	Ponding depth verification after plant and mulch placement.	
☐	**Certification of Pretreatment and Plant Installation:** Inspector certifies the successful completion of any pretreatment measures, plants and mulch as listed above. Photos/Elevations required for this step include: o Overall photos of showing mulch and plants installed; o Location of inflow and appropriate energy dissipation; o *Microbioretention with sheetflow as the inflow: string line measurement showing the swale.* o *Bioretention with sheetflow as the inflow: survey of the swale.* o Any pretreatment measures required per the approved plans; o Distance from the top of the mulch to the top of the overflow (either pipe or berm). o *Microbioretention: string line measurement showing the surface of the microbioretention is level and has the appropriate ponding depth over the entire surface.* o *Bioretention: as-built survey that captures the top of mulch and top of overflow to achieve the proper ponding depth.* Material delivery tickets required for this step include: o Approved plants listing number and species; o Shredded hardwood mulch.	

BIORETENTION TESTING		DATE
☐	A bioretention that uses infiltration to drain (i.e., it has no underdrain) must be tested for infiltration rate upon completion and must function as designed.	

COMMENTS (CLARIFICATION, DEVIATIONS, ETC.)	DATE

All items checked above have been inspected by me (or by an individual under my responsible charge) and have been completed to my satisfaction and meet the approved plans (or deviations are noted here).

Signature:_____ Date: _____

Certifying Professional's License Number (or Seal): _____

- See attached sealed final location survey with the installed stormwater management facilities appropriately labeled and certification letter

Construction Inspection Checklist: Permeable Pavement

Bowman CONSULTING

Address/ Location: _____ _____

Project Name/ Number: _____ _____

Contractor: _____

Telephone: _____

Certifying Professional*: _____

Telephone: _____

Date Started: _____

Final Inspection Date: _____

**Certifying professional must be a licensed Professional Engineer (PE), Landscape Architect (LA) or Land Surveyor (LS) or DEQ Certified Inspector.*

The following checklist provides a basic outline of the anticipated items for the construction inspection of permeable pavement. This checklist does not necessarily differentiate between the types of pavement materials and the different construction requirements. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design is met. The standard for design of this practice is based on Virginia Stormwater BMP Clearinghouse .

All items should be crossed off when completed. **Items labeled "Certification of..." must be crossed off, dated and initialed by the certifying inspector.**

PRE-CONSTRUCTION MEETING		DATE
☐	Walk through site with builder/contractor/subcontractor to review the SWPPP (erosion and sediment control plan, the stormwater management plan, and the Pollution Prevention plan)	
☐	Determine when permeable pavement is built in project construction sequence; before or after building construction and determine measures for protection and surface cleaning.	
☐	Identify the tentative schedule for construction, verify the certification of the installer (ICPI for permeable interlocking pavers or NRMCA for pervious concrete) and requirements and schedule for interim inspections.	
☐	Storage locations for aggregate material have been identified (hard surface or on geotextile).	
☐	Conduct a pre-construction meeting with the contractor designated to install the permeable pavement, the person completing this checklist, and the Stormwater inspector	

SEDIMENT MANAGEMENT		DATE
☐	Access routes for delivery and construction vehicles identified.	
☐	Vehicle tire/track washing station location/maintenance (if specified in the erosion and sediment control plan/SWPPP).	
☐	Contributing drainage areas are stabilized and are not eroding.	

EXCAVATION		DATE
☐	Excavated area marked with paint and/or stakes.	
☐	Excavation size and location conforms to plan.	
☐	Runoff is diverted around the excavation area to a stabilized conveyance.	

☐	If excavation is used as a sediment trap: verify that the bottom elevation of the proposed stone reservoir is lower than the bottom elevation of the existing trap.	
☐	Subgrade surface is free of rocks and roots, and large voids. Any voids should be refilled with the base aggregate to create a level surface for the placement of aggregates and underdrain (if required).	
☐	For Level 2 permeable pavement, ensure the bottom of the excavation is scarified prior to placement of stone.	
☐	No groundwater seepage or standing water is present. Any standing water is dewatered to an acceptable dewatering device.	
☐	The excavation has achieved the proper elevations and grade (0% slope) as noted on the approved plans.	
☐	**Certification of Excavation Inspection:** Inspector certifies the successful completion of the excavation steps listed above. Photos required include excavated subgrade prior to covering with fabric and stone, and include measurement from subgrade to reference point (i.e., top of edge restraint, top of apron, top of garage entrance, top of flow barriers and flow barrier excavation cuts, etc.).	

	FILTER LAYER, UNDERDRAIN, STONE RESERVOIR, AND BEDDING LAYER PLACEMENT	DATE
☐	All aggregates, including, as required, the filter layer (choker stone & sand or geotextile), the reservoir layer, and bedding layer conform to specifications as certified by quarry.	
☐	Underdrain size and perforations meet the specifications (if applicable).	
☐	Placement of filter layer and initial layer of reservoir layer aggregates (approximately 2 inches) spread (not dumped) to avoid aggregate segregation.	
☐	Placement of underdrain, observation wells, and underdrain fittings in accordance with the approved plans.	
☐	Concrete curbs or plastic/metal edge restraints are installed.	
☐	Sides of excavation covered with geotextile, prior to placing stone reservoir aggregate; no tears or holes, or excessive wrinkles are present.	
☐	Flow barriers are properly installed (if applicable).	
☐	Stone reservoir layer and bedding layer is properly installed.	
☐	**Certification of Filter Layer, Underdrain, Stone Reservoir and Bedding Layer Inspection:** Inspector certifies the successful completion of the filter layer, underdrain, stone reservoir and bedding layer placement steps listed above. Photos and material delivery tickets for these items are attached. Photos required include: o Non-woven geotextile fabric installed on bottom and sides of excavated subgrade; o Perforated observation well prior to installation of stone; o Perforated underdrain (if applicable) and connection to storm sewer or dry well; o Depth of #2 or #3 stone installed (if applicable); o Edge restraints; o Depth of #57 stone installed; o Depth of #8 stone installed. Photos required of flow barrier (if applicable): o 12" height of berm; o 12" height of cut for flow barrier; o Impermeable liner; o Distance between flow barriers.	

	Material delivery tickets required include: ○ Choker stone & sand or geotextile installed at subbase; ○ Geotextile installed along sides; ○ Impermeable liner on gravel flow berms (if applicable); ○ #2 or #3 stone (if applicable), #57 stone, #8 stone.	
PERMEABLE PAVERS OR PERVIOUS CONCRETE INSTALLATION		**DATE**
☐	Permeable paver surface is installed.	
☐	If pavers are used, the joints are full of #8 or #9 stone.	
☐	**Certification of Pavement Installation:** Contractor and/or manufacturer certifies that permeable pavement has been placed in accordance with manufacturers specifications (ICPI Tech Spec #18 for interlocking concrete pavers or ACI#522.1-13 for pervious concrete). Photos required include: ○ Overall of completed installation; ○ Observation well with proper cap installed. Material delivery tickets required for the pavers or concrete installed.	
☐	The permeable pavement is protected until the remainder of the site is stabilized.	

COMMENTS (CLARIFICATION, DEVIATIONS, ETC.)	**DATE**

All items checked above have been inspected by me (or by an individual under my responsible charge) and have been completed to my satisfaction and meet the approved plans (or deviations are noted here).

Signature:_____Date: _____

Certifying Professional's License Number (or Seal): _____

- See attached sealed final location survey with the installed stormwater management facilities appropriately labeled and certification letter

Installer / Contractor's Certification (Required)

☐ **Permeable Interlocking Pavers:** Attach copy of ICPI Certification

☐ **Pervious Concrete:** NRMCA Certification* Number: _____

**NRMCA Certification must be either Installer or Craftsman certification.*